



ADMINISTRATIVE REPORT

Report Date: March 26, 2019
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Meeting Date: April 23, 2019

TO: Vancouver City Council
FROM: Chief Resilience Officer
SUBJECT: Resilient Vancouver Strategy

RECOMMENDATION

- A. THAT Council approve the framework for the Resilient Vancouver Strategy, generally as described in this report, and direct staff to finalize the Strategy and associated implementation plan.
- B. THAT Council direct staff to integrate the Resilient Vancouver Strategy framework and key findings from research and engagement into the development of the City-Wide Plan.

REPORT SUMMARY

This report introduces the Resilient Vancouver Strategy, and a framework for strategic objectives and actions to build resilience to major shocks, stresses and trends impacting our city and future generations. Pending Council direction and approval, these will be refined, finalized and published as the Resilient Vancouver Strategy.

Resilience is the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and thrive, no matter what kinds of chronic stresses and acute shocks they experience. Shocks are single event disasters, such as earthquakes, floods and extreme weather. Stresses are factors that put pressure on a city on a daily or reoccurring basis, such as social isolation, unaffordability, or racism. If not proactively identified and managed, stresses can become slow-moving disasters. City resilience is about making a city better, in both good times and bad, for the benefit of all its residents and future generations.

This report and strategic framework summarizes the findings and outcomes of a two-year process involving input from over 2,500 stakeholders, experts, community groups, non-profit

organizations, and other levels of government. It has been a cross-City effort, with all departments working closely together to identify objectives and actions which have co-benefits across multiple city-wide goals, such as reducing seismic risk, reducing water and energy consumption, and addressing affordability.

The Strategy is structured around three priority areas which focus on:

- 1) Thriving and Prepared Neighbourhoods
- 2) Proactive and Collaborative Government
- 3) Safe, Adaptive Buildings and Infrastructure

Each priority area has focused objectives and specific actions. These build on and complement existing City work, while also addressing significant gaps and risks to the City. A number of actions are already underway, and others can be initiated by 2021 pending council approval.

Through this program of work, the City has been successful in leveraging over \$2 million in research with external partners, and has confirmed additional support for forthcoming initiatives. As a successful applicant to the 100 Resilient Cities (100RC) program, the City received funding for a Chief Resilience Officer and access to a global network of cities, researchers and consultants sharing expertise and information to build city resilience.

As part of the Resilience Strategy process, the City has already begun embedding resilience as an explicit objective in existing process, programs and policies. These efforts will continue with major planning initiatives such as the City-Wide Plan, the Employment Lands Study, and the development of the Poverty Reduction Strategy and Equity Framework.

COUNCIL AUTHORITY/PREVIOUS DECISIONS

Previous Council Decisions on Resilience Program:

- **Resilient Neighbourhoods Program:** On July 25, 2017, City Council approved the allocation of an Innovation Fund Grant for the establishment of the Resilient Neighbourhoods Program, including \$210,000 in grants for 4 neighbourhood partners, and the additional commitment of \$40,000 to be distributed for Neighbourhood Preparedness Grants and support scaling of the Resilient Neighbourhood Program. City Council approved that staff report back to request Council approval for specific grant recommendations. Staff will be developing a small grant stream through which to allocate grants pending council approval of this report.
- **Women's Equity Programming Budget:** On January 29, 2019, City Council approved a budget of \$115,000 to support complementary programming related to women's equity before, during and after the Women Deliver Conference. Included in this is \$15,000 contribution to a Women in Resilience event. This event will showcase the unique knowledge and experience of women and gender-diverse people in preventing and recovering from disasters.

In addition to the above Council decisions specific to the Resilience program, this work closely aligns with and builds upon a significant volume of work underway related to the Healthy City Strategy, Greenest City Action Plan, Housing Vancouver and other affordability initiatives, City of Reconciliation Framework, Climate Change Adaptation Strategy, the Renewable City Action Plan and the Earthquake Preparedness Strategy.

CITY MANAGER'S/GENERAL MANAGER'S COMMENTS

The City Manager supports the Resilience Strategy framework presented in this report and the recommendation for Council endorsement.

REPORT

Background and Context

Vancouver is recognized around the world as a progressive city committed to a sustainable future. We are home to a wonderfully diverse population, unparalleled natural beauty, a vibrant creative sector and Canada's fastest growing economy. At the same time, Vancouverites face many complex and interconnected challenges impacting the resilience of our residents, neighbourhoods, businesses and urban systems.

Vancouver is not alone. The 2019 Global Risk Report identifies failure of climate mitigation, natural disasters, and extreme weather events as among the most significant threats to global stability in both likelihood and impact. In addition, declining trust in government, increasing political polarization, declining mental health, and economic and social inequities are identified as critical factors undermining humankind's ability to survive, adapt and thrive.¹

These trends play out in Vancouver, where our sustainable future is threatened by a combination of disaster risk and climate change, social and economic inequity, cycles of mental health and addiction crises, aging infrastructure, and policies and patterns that reinforce and contribute to new risk as our region grows.

We are among the most at-risk cities in the world for catastrophic earthquakes and sea level rise. Wildfire smoke and heat and cold warnings have become our "new normal" and continue to disproportionately impact people that experience social isolation, chronic health issues, poverty, and other challenges. Transformative policies, partnerships and investment are required so that our public and private infrastructure can serve our community in a rapidly changing future. New challenges emerge constantly; in our highly connected world, cyber-threats and supply-chain disruptions can paralyze our economy in an instant. Proactive planning is critical but increasingly difficult, as we concurrently react to the impacts of an affordability crisis, an opioid crisis, a climate emergency, and deeply embedded social inequities.

Fostering resilience and finding local solutions to these shocks and stresses demands collaboration and creativity. It requires us to take a holistic and inclusive approach to understanding the drivers of risk in our community and anticipating future trends.

At the beginning of a City-wide planning process, and supported by strong partnerships, Vancouver is well-positioned to rise to this challenge. Work is already underway across our community to advance this mission. Through a collaborative and human-centred approach, and by leveraging the creativity and experience of our community and our partners, we can invest in the health, well-being and affordability of our community today, while actively reducing risk for future generations. There will be trade-offs and tough decisions, but there are also opportunities for co-benefits.

¹ <https://www.weforum.org/reports/the-global-risks-report-2019>

Resilient Vancouver Strategy

Resilient Vancouver is a strategy aimed at enhancing the capacity of our neighbourhoods, our government and our infrastructure to serve our diverse communities today, and to withstand and recover from inevitable shocks. The strategy has been developed through in depth consultation with community and is informed by new research and analysis about our local risks and hazards.

This report summarizes the strategy development process, highlights key learnings, and lays out 12 strategic objectives with supporting near-term actions recommended as a framework for the final Resilient Vancouver Strategy.

The objectives and actions proposed for this strategy build on and knit together significant work already underway across our community, and under the leadership of our Council. Collectively, the 12 strategic objectives provide a lens through which staff can evaluate projects and processes to enhance the resilience of our city. The 45 actions are not an exhaustive list of tasks - rather, they represent tangible steps identified by community and through research that can be taken to address critical gaps in our knowledge, and promote different ways of thinking and working with community to reduce risk and foster positive outcomes for more people today and in the future.

Integration with City Wide Plan

If approved, staff will integrate and implement relevant components of the Resilient Vancouver Strategy through the development of the City-Wide Plan which will address a broad diversity of policy areas including land-use, transportation, economy, social, environment, parks, culture, sustainability, climate change, infrastructure, and place-making/ urban design with lenses of reconciliation, resiliency and equity. The City-Wide Plan would provide an “umbrella” for integrated, long-range strategic policy across these areas and a framework to support more detailed implementation of strategies in specific areas such as resiliency.

Many of these actions and objectives can and should be advanced through the City Wide Planning process, while others complement and enhance work in different areas like community emergency preparedness and asset management.

Partnership with 100 Resilient Cities

In 2015, City staff identified a strategic opportunity to access resources and expertise to advance critical pieces of work by applying for the 100 Resilient Cities (100RC) program. Pioneered by the Rockefeller Foundation, 100RC is a global network and grant program aimed at supporting cities to build resilience to pressing social, economic, political and ecological challenges. Vancouver was awarded membership in the network through a competitive process in 2016, joining 99 other cities in a commitment to support each other in developing urban resilience strategies.

Vancouver’s membership in this network has enabled the City to fund the position of Chief Resilience Officer for 2 years, and facilitated access to experts, academics, and a network of cities working on similar issues. Vancouver has leveraged the resources provided through our 100 Resilient Cities partnership to address critical gaps in our knowledge related to seismic risk, evaluate our approach to critical infrastructure, and to launch a Resilient Neighbourhood Pilot

Program to learn with and from community partners. Further detail on the financial benefits of this program and funds leveraged are included later in this report.

Complementary Resilience Work - A Strong Foundation

Foundational to the Resilient Vancouver Strategy is the continued work towards Reconciliation, the development of an Equity Framework, our response to the Climate Emergency, and efforts to build strong and reciprocal partnerships across our community; this recognition forms the basis for the guiding principles of the strategy.

In addition, we can and should recognize and elevate an important body of work underway to address and respond to many of the top issues and challenges identified by City staff and community. This work provides a strong foundation, and an opportunity to learn and reflect on successes and challenges.

Examples of ongoing work that contributes directly to our resilience as a community include:

- Housing Vancouver Strategy and related work dedicated to housing and commercial affordability and enhancing support for tenants.
- Efforts to respond to the Opioid Crisis and de-stigmatize mental health and addictions
- Actions that support community place-making, social connection and belonging, as supported by the Healthy City Strategy and advanced through initiatives like the VIVA Vancouver program
- The Climate Adaptation Strategy, refreshed in 2018, efforts to reduce coastal flood risk, and the declaration of a Climate Emergency to accelerate climate mitigation
- The One Water Initiative that will to evaluate opportunities for green infrastructure and long-term water resilience.
- Investment in critical roads and bridges, including Council's award of a design contract for the seismic upgrade of Cambie Street Bridge, will contribute to more effective disaster response capabilities.
- Recent investments in cyber-security and IT resilience initiatives that will support our city in responsibly adopting new technologies and protecting critical digital infrastructure.
- Earthquake Preparedness Strategy, including actions that have significantly enhanced response capabilities for the organization, and prioritized civic facilities for seismic upgrades.

It is not the intent of this strategy to duplicate work; rather, the Resilient Vancouver Strategy complements, coordinates and elevates this work, and addresses critical gaps. By proposing changes in the way we work and integrating a resilience lens across all city initiatives, the strategy aims to foster strong, positive and fiscally responsible outcomes for Vancouverites. Case studies highlighting ongoing community and City initiatives will be showcased in the final strategy document, alongside new actions.



Figure 1: 100 Resilient Cities Network. Staff across departments are leveraging this network to learn and share information on a wide range of issues including equity indicators, inclusive growth, cyber-security, urban forestry, community engagement, disaster risk reduction, and city planning. Vancouver's closest working relationships are represented by blue lines.

Strategy Development Process

To develop the Resilient Vancouver strategy, staff have engaged and learned from thousands of local residents and stakeholders, examined the impact of many of our own city processes and policies, and consulted with cities around the world. We inventoried ongoing work contributing to resilience and identify key gaps and opportunities not yet being addressed. We have worked with local and global networks to advance research and foster creative approaches to enhancing resilience in our community. The process was kicked off in 2017 and includes three phases of work:

Phase 1 – Preliminary Resilience Assessment

In 2017 staff consulted with over 2,500 stakeholders and completed research to:

- Understand what resilience means to Vancouverites;
- Document community perspectives on local trends, shocks and stresses;
- Identify critical gaps in knowledge, policy, and action;
- Inventory actions underway that support resilience (for example efforts related to climate adaptation and housing); and
- Identify areas of influence where the City could have the greatest impact.

All City departments were engaged to provide input and help define areas of focus. Work from phase 1 is consolidated into a Preliminary Resilience Assessment, available online.

Phase 2 – Research, Analysis and Prioritization

In 2018 and into early 2019, staff undertook a targeted series of studies, engagements, and activities aimed at addressing gaps in our knowledge and practice related to city resilience. At the same time, we worked with multiple partners to develop a set of objectives and actions to build resilience in Vancouver. Work completed in phase 2 includes:

- Convening a seismic policy advisory committee and conducting a seismic risk assessment for buildings city wide;
- Conducting a best practice review of critical infrastructure management in cities worldwide;
- Initiating research on financial resilience and innovative finance and insurance products
- Partnering with community to understand the drivers of resilience within neighbourhoods and to co-create and test a series of tools for building neighbourhood resilience; and
- Working across departments to identify opportunities for coordination and alignment of resilience-building initiatives.

The outputs from Phase 2 have resulted in the objectives and actions defined for the Resilient Vancouver Strategy.

Phase 3 – Strategy Development and Implementation

In mid-2019 and beyond, and pending the direction of Council, staff will finalize and release the Resilient Vancouver Strategy with a series of engagement opportunities, integrate elements of the strategy through the City Wide planning process, and initiate implementation of priority actions.

Strategic Analysis

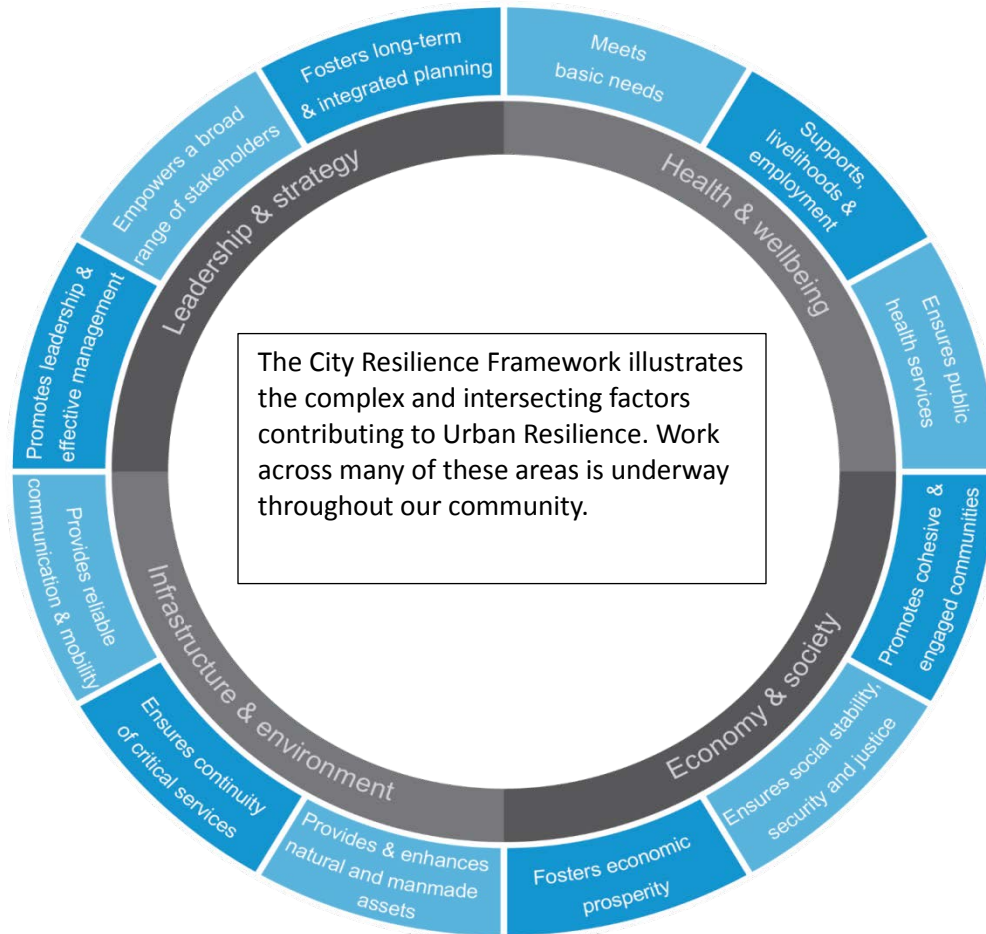
A. Phase 1 - Preliminary Resilience Assessment Summary

What Is Resilience?

100 Resilient Cities defines urban resilience as *“The capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow, no matter what kinds of chronic stresses and acute shocks they experience.”*

Shocks are typically considered sudden onset events, such as earthquakes, floods and extreme weather. Stresses are conditions that weaken the urban fabric of a city on a daily or reoccurring basis, such as social isolation, unaffordability, or high unemployment. Stresses are often symptomatic of systemic and institutional barriers.

To support conversations in community, Vancouver leveraged 100RC’s City Resilience Framework, and discussed the different factors influencing the way that shocks, stresses and trends are experienced locally.



What Does Resilience Mean To Our Community?

Resilience means different things to different people. In our consultations with over 2,500 stakeholders, many people spoke about disasters and the failure of physical infrastructure as being key threats to resilience that we need to understand and manage. However, most people connected resilience with human capacity and experience. Many people spoke about the criticality of sustaining social and cultural connections, networks and infrastructure in order to ensure that our community can adapt to change, combat stresses and recover from shocks. In other words, social and physical factors are closely connected, and must be considered together in the development of resilience solutions.

Community responses to the question “What does resilience mean to you?”

- “The ability to bounce forward”
- “The collective strength and ability to recover and adapt without the loss of our core identity”
- “Learning from challenges and becoming stronger”
- “A community that can rebound and recover”
- “People being able to help each other in times of crisis, disaster, and social problems”
- “Healing and being able to help”
- “Planning with love for future generations”

Our Community Is Our Greatest Asset

The resilience conversation often starts with discussion about gaps and negative experiences; however, we also heard from community about the many strengths that we must build on and learn from.

Most importantly, here on the unceded territory of the x^wməθk^wəy^əm (Musqueam), Sk^wxwú7mesh (Squamish) and səliiwətaʔt / səliiwituh (Tsilil-Waututh), we have much to gain and learn by recognizing and elevating the knowledge of Indigenous Peoples who have been here for millennia and long embodied resilience and reciprocity through law and culture. Indigenous People continue to demonstrate incredible resilience through their work to revitalize their languages and cultures, reclaim and name their spaces, and in fighting to shape a new relationship between all people within this land.

Community responses: What are Vancouver's greatest strengths?

- Diversity and lived experience of residents
- Strong entrepreneurial spirit
- Culture of economic and social innovation
- Artistic and creative sectors
- Non-profits and local businesses contributing to vibrant communities
- Civic assets, including community centres and libraries
- Commitment to the environment
- Access to parks and protection of nature
- Growing green economy

Community responses: What are examples of resilience in Vancouver?

- The ongoing fight for Indigenous Rights and Freedoms and reconciliation.
- The response of the Squamish Nation during the Great Vancouver Fire in 1886.
- Community-led response and advocacy around the ongoing opioid crisis.
- City response to the refugee crisis and support for new immigrants.
- Successful lobby by Chinatown and Strathcona residents to stop the freeway.
- Indigenous naming of gathering places and civic sites.
- Community coming together to clean up after the Stanley Cup Riots.
- Embracing LGBTQ and 2-Spirited human rights.

Further analysis on strengths has been captured in the Preliminary Resilience Assessment. The final Resilient Vancouver Strategy document will highlight these strengths alongside stories from our community.

Challenges Facing Our Community

When we spoke to community about what would impact resilience in Vancouver, we heard that resilience is about more than shocks and stresses. It is also about our capacity to anticipate and shape future trends, and to understand how those trends will change the nature of our systems and communities, for better or for worse.

The table below shows the perceived top shocks, stresses and trends as identified by our community in 2017. This is not an exhaustive list, but demonstrates the complexity of the

challenges we are facing, and the breadth of issues our community feels is influencing our collective resilience.

Shocks	Stresses	Trends
<i>What sudden events would have the greatest impact on resilience in Vancouver?</i>	<i>What chronic issues impact our ability to thrive today and in the future?</i>	<i>What changes and trends do we need to prepare for?</i>
<ul style="list-style-type: none"> • Earthquakes • Extreme weather • Oil spills • Economic downturn • Opioid crisis • Cyber attack • Air quality, wildfires • Flooding and storm surge • Disease outbreaks • Infrastructure failure 	<ul style="list-style-type: none"> • Lack of affordable housing • Lack of social cohesion • Climate change • Sea level rise • Commercial affordability • Racism • Social and economic inequity • Food insecurity • Addictions, mental health and stigma • Environmental degradation • Aging infrastructure 	<ul style="list-style-type: none"> • Aging populations • Digital transformation and automation • Artificial intelligence • Net neutrality • Global migration • Declining trust in government • Global conflict • Global population growth • Resource production and depletion (food, water, energy)

Table 1: Top shocks, stresses and trends identified by Vancouverites through stakeholder consultation (2017)

As noted above, there is significant work underway to address a number of these issues. However, gaps remain in the way that we understand the relationship between shocks, stresses and trends overall and in our capacity to integrate risk reduction and resilience into our processes.

B. Phase 2 – Summary of Research, Analysis and Key Learnings

The next section provides additional detail on the top shocks and stresses, and summarizes the outcomes and learnings from work undertaken in phase 2, including a technical assessment of earthquake risk, research on neighbourhood resilience and the co-creation of the Resilient Neighbourhood Tool-kit, and an examination of gaps and opportunities related to infrastructure resilience.

Vancouver's Hazard & Shock Profile

Natural and human-caused hazards make up a significant component of the greatest shocks identified by Vancouverites. A snapshot of Vancouver's top hazards is provided below.

Climate and Geo-Physical Hazards & Shocks	Earthquakes	Vancouver is at daily risk of a catastrophic earthquake; less than half of Vancouverites report being prepared. Hundreds of thousands of people in the region would be displaced by a major earthquake, with up to \$100 billion in damages ² . New analysis is provided below on earthquakes.
	Sea Level Rise / Coastal Flooding	Conservative models predict a minimum sea level rise of 1m by 2100 that will impact 13 km ² of land in Vancouver (\$7 billion of land, buildings and infrastructure) and increase the frequency and severity of coastal flooding and storm surge, threatening shoreline habitats, parks and low-lying urban areas and infrastructure. Approximately \$1 billion of flood management infrastructure will be needed to deal with the sea level rise along, by the year 2100. In 2019, City Council declared a climate emergency and sought appropriate actions to ensure Vancouver is doing our part to mitigate this damage.
	Extreme Weather and Temperatures	By 2050, hot days will be 4°C hotter and heat waves more frequent; rainfall event intensity will increase 33 % – 63%. Extreme heat and cold are already impacting Vancouverites.
	Forest Fires / Air Quality	2017 and 2018 were the worst fire seasons recorded in BC. In 2017 alone, 1.2 million hectares of land burned, over \$568 million spent on fire suppression, and over 65,000 British Columbians displaced, with many evacuees coming to Vancouver for support and shelter ³ . In the future the number of climate refugees will increase and air quality will worsen for Vancouverites as a result of regional fires, and risk of more localized forest fires will increase.
	Regional Flooding	The Lower Mainland is at significant risk of flooding from the Fraser River and coastal storm surge events that threaten significant regional infrastructure and supply chains. Worst case flooding today is estimated to cost \$19 billion for coastal flooding and \$22b for riverine flooding. Without active risk reduction measures, this is projected to increase to \$24 and 32 billion respectively by 2100. ⁴

² <http://assets.ibr.ca/Documents/Studies/IBC-EQ-Study-Full.pdf>

³ <https://www2.gov.bc.ca/gov/content/safety/wildfire-status/about-bcws/wildfire-history/wildfire-season-summary>

⁴ https://www.fraserbasin.bc.ca/Library/Water_Flood_Strategy/FBC_LMFMS_Phase_1_Report_Web_May_2016.pdf (p 19)

Technological and Health Hazards & Shocks	Public Health Emergencies – Opioid Emergency	The ongoing opioid emergency is one example of a public health emergency. A poisoned opioid supply has resulted in thousands of lives lost and millions of dollars re-directed towards response. Exacerbated by stigma, a shock occurs every time a new poisoned supply is released in Vancouver.
	Oil Spills	Marine and pipeline oil spills increase in likelihood with increased shipping. A worst-case marine oil spill may cost over \$1 billion to local economy and in clean up, and may expose a significant number of people to toxic fumes. A 2014 study indicates Vancouver’s US\$31 billion brand value, could be impaired by US\$3 billion from a major oil spill. ⁵
	Hazardous Materials	Hazardous materials move regularly through Vancouver via road, sea and rail. Many are concentrated around port and industrial lands. HazMat incidents contaminate soil, air and water, threatening human and ecological health. For example, in 2015 a container fire spread toxic smoke across parts of East Vancouver for 2 days before being extinguished.
	Infrastructure Failure and Disruption	Infrastructure failures and disruption have broad consequences for interdependent systems. Cyber-attacks, gas-line failures, power outages, computer glitches and transit shut-downs pose unique and complex risks to our economy, people and critical systems.
	Residential Fires	Vancouver Fire and Rescue Services responds to hundreds of fires annually. Each year 20-30 of these require an Emergency Social Services (ESS) response to provide basic needs support to evacuees with no alternative shelter or support networks.

Table 2: Vancouver’s Hazard Profile

Digging Deeper – Earthquakes

Earthquakes cause more deaths worldwide than all other disasters combined. Between 1998 and 2017 earthquakes accounted for 3% of the global population impacted by disasters but they contributed to 56% of deaths. While we often measure the severity of disasters in terms of death and economic damage, disaster have long-term impacts for individuals and communities that experience loss. Earthquakes trigger cascading impacts and secondary and tertiary disasters that include hazardous materials incidents, public health emergencies, and fires. Social stresses, such as housing affordability and meeting the needs of vulnerable residents, are multiplied many times over in the aftermath of an earthquake.

In Vancouver, earthquakes pose an exponentially greater threat to lives and livelihoods than any other natural hazard. Vancouver has advanced a significant amount of work over the last 2 decades to enhance preparedness and response for earthquakes, based on the information available at the time, and best practice in other jurisdictions. With respect to our own facilities, Vancouver has a prioritized inventory of buildings requiring upgrades or redevelopment and has already acted on the highest risk facilities. The Dedicated Fire Protection System ensures emergency fire capabilities in the downtown core and hospitals. Vancouver’s Urban Search and Rescue Team (USAR) trains with 4 other Canadian teams that will be critical for earthquake response.

⁵ <https://vancouver.ca/green-vancouver/neb-evidence-library.aspx>

However, relative to other shocks, the science and modelling has lagged and we have historically known much less about their impact. This means that while we have been able to make investments in response based on best practice and general understanding of earthquakes elsewhere, we have not been able to meaningfully measure risk or risk reduction based on the specific conditions and risks in Vancouver. In particular we have lacked an understanding of the way that regional earthquakes may impact local buildings and infrastructure. These gaps were highlighted in the City's 2013 Earthquake Preparedness Strategy.

In 2018, staff convened a technical expert advisory committee, and established partnerships with Natural Resources Canada, the University of British Columbia and local professional engineers to conduct a comprehensive, neighbourhood scale seismic assessment, necessary for advancing risk reduction action and policy.

As part of this process, staff modeled one of the more likely earthquake scenarios: a 7.3 magnitude earthquake centred in the Strait of Georgia, similar to Christchurch, New Zealand's 2011 earthquake. This type of earthquake, with its epicentre closer to Vancouver, is expected to have a bigger direct impact to Vancouver than greater magnitude earthquakes further away (such as the Cascadia subduction zone earthquake modelled by AIR on behalf of the Insurance Bureau of Canada⁶).

New data and modelling technology has enabled resilience staff working with the expert advisory committee to evaluate the specific ways that different building types will perform and how neighbourhoods, businesses and people are likely to be impacted. This assessment is ongoing, but early outputs demonstrate the scale of risk our city faces, and future work is recommended through the Resilient Vancouver Strategy. A high-level overview of modelling outcomes is included below.

⁶ <http://assets.ibc.ca/Documents/Studies/IBC-EQ-Study-Full.pdf>

What can we expect from a 7.3 magnitude earthquake in the Georgia Strait?

If this earthquake were to occur today, current modelling focused on damage to buildings ⁽¹⁾ indicates that:

- Nearly one in ten buildings is likely to be unusable
- Large sections of downtown, the West End, and Downtown East Side will need to be cordoned off due to heavy damage, leaving them inaccessible for months or longer.
- Significant damage will occur to buildings and businesses located along commercial corridors and arterials, impacting road access as well as economic recovery
- Nearly half of the residents of our city would be displaced for more than a month, nearly 150,000 for more than three months. ⁽²⁾
- Many of our affordable housing and rental units will be rendered unusable and will need to be demolished.
- More than 11,500 people are likely to be injured, and of them more than 1,100 will be injured severely or fatally.

Notes:

- ⁽¹⁾ All numbers above relate only to the projected immediate impacts from damage to buildings and do not include other infrastructure, secondary impacts like fires, liquefaction-induced ground failures, or façade-related damage and injuries, nor the longer term impact of the loss of social services
- ⁽²⁾ Researchers confirm that these numbers are conservative. In similar events, like the 2011 Christchurch Earthquake, reconstruction has lasted years.

This foundational work is critical to strengthen Vancouver's understanding of earthquake risk, and to expand our approach from the current focus on immediate life-safety and response (hours and days immediately after an earthquake), to one that encompasses proactive risk reduction, mitigation and recovery (weeks, months and years before and after an earthquake).

The 2013 Earthquake Preparedness Strategy has greatly improved preparedness and response capabilities. Today, new data, partnerships and information enables us to do more to prevent the consequences of earthquakes, and to further evaluate response capabilities and gaps to target investment and mitigation geared towards risk reduction and recovery.

To build on this model, more work needs to be done to understand how different types of earthquakes will impact our city and to evaluate the impact of earthquakes to infrastructure (roads, bridges, water systems, communications, etc.), and secondary impacts such as fires or lack of access to social services. Additional work also needs to be done to understand the compound risks associated with climate change and other hazards, and to target and prioritize interventions appropriately.

Stresses Lead to and Exacerbate Shocks

Social and economic factors are an important indicator of resilience to shocks. Global statistics show a 7-fold increase in disaster-related deaths in low and middle income countries over wealthier nations⁷. The World Bank estimates that natural disasters push an additional 26 million people into poverty each year.⁸

These trends are reflected at the local level. Without coordinated proactive action, the impact of inevitable shocks will fall disproportionately to people already experiencing chronic stresses, such as housing insecurity, poverty and social barriers, they will exacerbate our affordability crisis, and they will overwhelm the capacity of our communities to respond. And while Vancouver is vulnerable to catastrophic events, a culmination of chronic stresses (aging infrastructure) and the persistent occurrence of smaller events (snow storms, heat waves) play out in a similar fashion over time. We can see this in the way that a snow storm or a heatwave is an inconvenience for some, and a life-threatening event for others, and in the impact to people when poor building and infrastructure maintenance leads to failure and unsafe conditions.

Rarely are these human impacts accurately modeled or captured in data, but we know that the strength and connectedness of communities day-to-day, access to services, age of infrastructure, and pre-existing economic conditions are strong indicators of the capacity of communities to adapt, heal and thrive in the face of shocks. Understanding the stresses that are impacting our community day-to-day is critical to creating solutions that will build real resilience for our residents and our systems, regardless of if and when disaster strikes.

The tables in the following sections summarizes key local social and economic, and infrastructure and environmental stresses and trends respectively.

⁷ https://www.unisdr.org/files/61119_credeconomiclosses.pdf

⁸ <https://www.worldbank.org/en/results/2017/12/01/climate-insurance>

Social and Economic Stresses and Trends

Social and economic stresses and trends have significant impacts on resilience, and can lead to or exacerbate shocks.

Social and Economic Stresses and Trends	Affordability	Consistently identified as the least affordable city in North America, unaffordable commercial and residential properties, coupled with low average incomes, and rising costs of food and services fuel the affordability crisis. Employers are challenged to attract and retain talent, while young families are moving away from the city.
	Aging Population	Projections indicate a 92% increase in the number of people aged 65 and older by 2041, and a 10% increase in people aged 0-64. While many seniors are living longer, healthier lives, the number of seniors experiencing poverty and housing insecurity is rising, putting new demands on social and government services.
	Debt and Low wages	Vancouverites carry more debt than anywhere else in Canada, and are vulnerable to even small economic changes ⁹ . In 2015, Vancouver's median income was \$65,327, compared to a Canadian median income of \$70,336. There is a \$7,000 difference in median salary between men and women.
	Food Insecurity	In Vancouver 10% of households experience food insecurity, with single mothers having the highest rates of any household type at 34% (5 times higher than couples with no children) ¹⁰ . Food insecurity has life-long impacts on health and wellbeing of individuals and communities. Food security is also threatened by a decline in culturally appropriate foods. 56% of food service retailers in Chinatown were lost between 2009-16.
	Homelessness	The 2018 homeless count identified 2,181 homeless people in Vancouver. Indigenous people are vastly overrepresented in these numbers. In 2018 and 2019, modular housing has been constructed as a temporary response to this crisis. In the event of a major earthquake, more than 100,000 people would be immediately homeless.
	Inequity and Exclusion	Underrepresentation of non-white, gender diverse, and people with disabilities in civic leadership roles and engagement activities reflect embedded institutional barriers. During consultations, community shared that inequity and exclusion of diverse voices reinforces these barriers through decision making and planning processes.
	Poverty	More than 1 in 5 children in Metro Vancouver live in poverty, including more than 40% of children in single-parent homes ¹¹ . Nearly half of residents in Vancouver do not earn a living wage, while 70% of people in the Downtown Eastside are considered low income.
	Racism	A 2017 survey found that 82% of people identifying as visible minorities experienced racism, and 33% said they have been a target of abuse ¹² . Racial inequity has been deeply embedded in Vancouver through policy for generations, and a rise in racist sentiment in Canada undermines resilience efforts through hate and fear. Almost half of Vancouverites today were born outside Canada, and 2.2% of residents (14,000) identify as Indigenous.
	Social Isolation	A recent survey found that 50% of Vancouverites are unable to identify four people they could confide in, and only 54% reported a strong sense of community ¹³ . Almost 40% of households in Vancouver are single person. In a disaster, social isolation creates barriers to neighbours taking care of each other.

⁹ <https://globalnews.ca/news/4057149/vancouver-highest-debt-transunion/>

¹⁰ http://www.bccdc.ca/pop-public-health/Documents/Household%20food%20insecurity%20in%20BC_Vancouver%20Coastal%20infographic.pdf

¹¹ <https://still1in5.ca/regional-factsheets/>

¹² <https://www.vancity.com/SharedContent/documents/News/Vancity-Report-Immigration-racial-discrimination.pdf>

¹³ https://www.myhealthmycommunity.org/Portals/0/Documents/Community%20Profiles/Vancouver_final.pdf

Table 3: Social and Economic Stresses and Trends
Digging Deeper: Neighbourhood Resilience to Shocks and Stresses

Neighbourhood and community organizations play a key role in combatting social and economic stresses and fostering resilience. Supported by an Innovation Fund Grant and community partners, Vancouver leveraged the Resilient Vancouver Strategy Process to initiate the Resilient Neighbourhood Program. This pilot enabled deep engagement with four very different community organizations in four different neighbourhoods, to concurrently build resilience while informing actions for the strategy.

The pilot has resulted in the co-creation and testing of community asset mapping tools, resilience action plans, delivering emergency preparedness training and exercises, and the sharing of knowledge, ideas and challenges across diverse communities. It has also enabled partner organizations to lead their own resilience building efforts. Some of the highlights of this program have been:

- Britannia Community Services Centre hosted local teens for a “Hunger Games” event, challenging them to work together using limited resources to set up shelters, find water, and communicate with each other.
- Collingwood Neighbourhood House convened a “Community Connections and Resilience Lab”, engaging community stakeholders to create and test prototypes to enhance community connection and resilience.
- Dunbar Community Centre Association ran two Disaster Support Hub exercises, and shared this experience with other associations and neighbourhood groups.
- 312 Main collaborated with students at Emily Carr University to explore local food resilience and design emergency food initiatives for the neighbourhood.

This pilot has been central to examining the intersection of shocks and stresses within diverse communities. From the need to foster trust and empathy through community dialogue, to the importance of accessible information about risks and hazards, this pilot has revealed a wide range of opportunity for neighbourhood capacity building.

We heard that formal and informal networks already exist that can be leveraged, and that the City can play an important role in supporting and strengthening these existing networks and enabling them to flourish and adapt to serve the changing needs of community.

Food access, resilience and security was a common theme in discussions of neighbourhood resilience. For some people, accessing food day-to-day is a challenge, so storing food for emergencies is unrealistic. For people that rely on non-profits and community kitchens for meals, there was a recognition of the need to invest in the resilience of these services and of the opportunity to leverage them to provide food during emergencies. Many people spoke to the role that food plays in strengthening cultural and community connections.

There is strong support for initiatives underway that contribute to place-making and pride, including Indigenous naming of civic spaces and the West End participatory budgeting pilot. Unfortunately, we also found many examples of a lack of space, red tape and permitting costs discouraging residents and groups from pursuing resilience-building actions in the places they live, work and play.

By providing a platform for discussion about resilience in neighbourhoods, the Resilient Neighbourhood Program has inspired additional community-led action. In particular youth and families are getting engaged, for example a group of Co-ops in Grandview Woodland have developed a community emergency response plan and continue to work to build capacity of their members to take care of each other and to serve the broader community. The Future City Builders chose Emergency Preparedness as the focus of their 2019 youth initiative, and 30 inspiring young Vancouverites have created bold and innovative concepts to advance resilience in Vancouver¹⁴, and the NeighbourLab co-operative was formed specifically to tackle neighbourhood resilience issues – designing an emergency bench that can provide supplies, power and a welcoming spaces for neighbours to gather around.

Overwhelming we heard that community organizations want to take a stronger role in resilience, and that community-led and place-based initiatives present unique opportunities for creating locally relevant solutions to unique neighbourhood resilience challenges – from disasters to local food security.

These learnings have been documented in a series of workshop reports, and are reflected in the objectives and actions in the framework for the Resilient Vancouver Strategy.

¹⁴ <https://www.youthfulcities.com/fcb-vancouver>

Environmental and Infrastructure Stresses and Trends

In addition to social and economic stresses and trends, Vancouver is vulnerable to a number of interrelated environmental and infrastructure stresses, as outlined in the table below.

Environmental and Infrastructure Stresses and Trends	Increasing Demand & Aging Civic Facilities	Many of Vancouver’s civic facilities including fire halls, police buildings, community centres, libraries, and service yards, were constructed before strict seismic and energy standards were in place. Well maintained and resilient facilities enable critical services and important community spaces; they are central to emergency response and recovery operations, and reduce risk to our community by providing safe, accessible shelter during emergencies. The City has a robust, risk-based Asset Management Program, that includes a Facilities Seismic Program prioritizing emergency response, business continuity and high occupancy buildings. Continued and accelerated investment in resilient civic facilities is an important component of community wellbeing and risk reduction, especially in high-risk neighbourhoods.
	Unsafe Buildings	There are more than 90,000 buildings in Vancouver. Vancouver sets high standards for new buildings, but has limited tools to improve older buildings, many of which are at high risk from earthquakes and contribute to climate change and unsafe and unstable conditions for tenants. The cost of renovations and the threat of renoviction are barriers to upgrades and safety that must be overcome.
	Water System and Resources	Water resources and infrastructure are under pressure from climate change, growth and earthquakes. By 2050 a 58% decline in snow pack will impact Vancouver’s drinking water reservoirs, while more intense rainstorms will increase risk of flooding. Currently 27% of assets are in poor or very poor condition, even with increased investment this will increase to 40% by 2030 due to aging infrastructure. Vancouver upgrades water pipes to higher seismic standards during repair and road work, however this does not guarantee the resilience of water systems on private property.
	Food System Resilience	Relatively little is known about the resilience of local food and supply chains. A 2009 report identified that there 72 hours of produce in Vancouver at any given time ¹⁵ . Many Indigenous and local food sources have declined through development, pollution and invasive species, and are under continued pressure from climate change. Shocks like earthquake threaten access to food resources. Many food suppliers, community kitchens, businesses and non-profits lack business continuity and emergency plans.
	Regional Infrastructure and Supply Chains	Regionally, highways, rail lines, pipelines, and digital networks that serve Vancouver are constructed in flood plains and seismic zones. They are vulnerable to extreme weather, landslides, avalanches and accidents. Disruptions to supply chains limit access to food, water, energy and supplies for Vancouverites, and have significant impacts to the national economy.

Table 4: Environmental and Infrastructure Stresses and Trends

¹⁵ <http://www.vancouvereconomic.com/wp-content/uploads/2016/07/the-economy-of-local-food-in-vancouver.pdf>

Digging Deeper – Infrastructure Financing and Risk Reduction

Compared to other Canadian cities, Vancouver’s hazard profile contributes to heightened exposure to shocks with significant long-term impacts. Exposed local and regional infrastructure is a key driver of risk and economic loss. For example, our region is vulnerable to both catastrophic earthquakes and floods, and while these events do not occur frequently, the magnitude of impact dwarfs that of other major Canadian hazards. The table below compares these potential disasters with other significant disasters experienced elsewhere in Canada.

Event	Cost
9.0 m Cascadia Earthquake (modelled)	\$75 billion direct economic loss; \$100 billion indirect (projected)
500-year Fraser River Flood (modelled)	\$20 – 30 billion direct economic loss (projected)
2017 Fort MacMurray Fire	\$4.54 billion direct; \$9 billion indirect
2013 Alberta Floods	\$6 billion direct losses ¹⁶
1998 Quebec Ice Storm	\$1.6 billion direct
2013 Toronto Floods	\$1.0 billion direct ¹⁷

Table 5: Canadian Natural Disasters and Economic Losses

In terms of recovery, Vancouver, like other municipalities, does not insure linear infrastructure and relies largely on the federal Disaster Financial Assistance Fund to cover emergency response and recovery costs for major events. Since 1970, this fund has released \$4 billion total.

A recent report from the C.D. Howe Institute confirms that without action to reduce risk, a major earthquake in our region will exceed risk tolerance thresholds for private sector insurance, overwhelm federal backstop measures, and exceed the capacity for recovery at all levels of government¹⁸. In other words, this is a regional problem with national economic implications that cannot be addressed exclusively through response planning and post-disaster recovery funding. Despite the costs identified above, and the significant economic risk associated with shocks in this region, there remain barriers to the integration and harmonization of risk reduction and resilience planning for infrastructure, especially between the City, the private sector, and other agencies and levels of government. Through analysis and consultation, staff and partners have identified the need to address these gaps and take action towards the following:

- Ongoing assessment of threats and hazards that could disrupt critical services, given the changing hazard-landscape, complexity of urban systems, and infrastructure interdependencies
- Evaluation of post-disaster service capabilities and restoration potential (ie: what level of service is likely or feasible in the aftermath of different hazards and in what time frame)
- Revision and integration of post-disaster recovery and service level targets across service and asset groups, to inform infrastructure design and prioritize response and recovery (i.e: what is the minimum level of service that needs to be maintained, and

¹⁶ <http://www.calgary.ca/UEP/Water/Pages/Flood-Info/Flooding-History-Calgary.aspx>

¹⁷ <https://ec.gc.ca/meteo-weather/default.asp?lang=En&n=5BA5EAF1&offset=3&toc=show>

¹⁸ https://www.cdhowe.org/sites/default/files/attachments/research_papers/mixed/Commentary%20454_0.pdf

how can infrastructure owners and operators design and plan to achieve those targets before and after a disaster)

- Multi-agency framework for evaluating and managing critical lifeline infrastructure, and stronger provincial or federal partnerships with municipalities.
- Development and refinement of hazard datasets and improvement of modelling tools to evaluate hazard impacts to infrastructure, and to prioritize risk reduction investments
- Formalized processes and policies to support proactive risk reduction in urban planning and design
- Exploring innovative options to address major funding gaps for infrastructure and improving cross-sector alignment, including ongoing and improved collaboration with the private sector, senior government and insurance industry on risk reduction.

From Response to Risk Reduction

The upfront investment required to meaningfully reduce risk is perhaps the greatest impediment to proactive risk reduction. Many cities fail to take sufficient action until crisis is imminent or a disaster has already occurred. Unfortunately this means that lives and livelihoods have already been lost, long term psychological impacts have been incurred, and funding is spent on trying to recover what is left.

In the context of large scale disasters and climate change, responding to floods and earthquakes costs 4-7 times more than investing in risk reduction measures, and does little to minimize the impact to human lives. Response and recovery funding and insurance claims are often slow to be released. These disasters cause significant social and economic setbacks, recovery can take years and short-term reactive decisions often result in unintended negative consequences.

Around the world and locally there is a growing acknowledgement of the need to shift from a culture of response to hazards, to a culture of risk reduction and resilience. In the context of infrastructure, this means assuming that shocks and hazards will occur, systematically evaluating the direct and indirect consequences of infrastructure failure to our community, and designing and investing proactively to minimize those consequences.

The City of Vancouver has been proactive on a number of fronts, including the installation of a Dedicated Fire Protection System, planning for a resilient road network in North East False Creek, and enhanced flood control levels to mitigate the impact of sea level rise. Vancouver has also evaluated and prioritized civic facilities for seismic upgrade and redevelopment based on life safety, business continuity and emergency response criteria¹⁹.

These are critical investments in our City's resilience, and more can and must be done to reduce risk for current and future generations. Vulnerability of civic systems is just one part of the picture – privately owned infrastructure and buildings, and systems operated by other government entities are all interconnected. Investments are being made by our partners –

¹⁹ Since the establishment of this Seismic program in 2013, REFM has relocated staff and public counters and completed the demolition of the highly vulnerable East Wing at City Hall Campus, upgraded the West Annex to 100% of current seismic code, and redeveloped Fire Hall #5. Upgrade and redevelopment planning is underway for Fire Hall #17, #12, and #1 as well as Britannia Community Services Centre, and the Marpole Community Centre.

however, more can be done regionally to understand the connections across different systems and sectors, and the cascading impacts of failure across our region. For example, we can do more to understand how disruptions to energy supply may impact water systems, or how the failure of specific roads or bridges could inhibit emergency response and economic recovery.

Today, new climate and earthquake data helps us to pinpoint and prioritize infrastructure and buildings at greatest risk, but we need additional support, resourcing and partnerships to model interdependencies, finance investment and accelerate resilience. With 1 million people set to come to our region in the next 30 years (not including the very real potential for a surge in climate or political migrants and refugees), we can and must consider how growth and development intersect with aging infrastructure, climate change, and hazards to increase the consequence of disruption. By doing this, we can actively plan in a way that reduces risk for future generations, and ensures health, safety and fiscally responsible growth.

This assessment has coincided with an opportunity to participate in a ground-breaking research and development collaboration centred in Vancouver. Spearheaded by Natural Resources Canada, 12 organizations including all levels of government, have come together to launch the “Pathways to Disaster Risk Reduction” project.

This \$4 million initiative funded in part through a federal grant, aims to address many of the above gaps by transforming regional understanding of the cascading impacts of earthquakes and climate change hazards and creating tools to enable cost-benefit analysis for risk reduction. By strengthening data and modelling capabilities and establishing indicators for resilience, the project will strengthen regional collaboration and enable strategic investment in resilient infrastructure. Through this work, Vancouver will model its own infrastructure interdependencies, develop hazard modelling tools, and be a leader in regional recovery and risk reduction efforts. Vancouver’s participation in this project over 2 years will support many of the Resilient Vancouver Strategy objectives.

Concurrent to this project, staff are also exploring innovative financing mechanisms, and learning from other jurisdictions, to understand how incentives and financing have been delivered to support risk reduction and upgrades ranging from the scale of single family homes to large – scale infrastructure projects. This work is ongoing and will continue as part of strategy implementation.

C. Proposed Framework for the Resilient Vancouver Strategy

Guiding Principles

Throughout our research on best practices and consultation, staff heard that continued work to advance Reconciliation, Equity and Ecological Sustainability are critical to the long-term resilience of our city, and must be pursued in concert with strategies to enhance resilience to shocks and stresses. Further, we heard that respectful, reciprocal relationships set the foundation for the collective action and trust required to address our greatest challenges. These 4 principles underpin our strategy, and will guide the refinement and implementation of actions within the strategy.

Reconciliation

As Vancouver is on the unceded territories of the xʷməθkʷəy̓əm (Musqueam), Skwxwú7mesh (Squamish) and səliwətaʔt / selílwituh (Tsliel-Waututh) Nations, it's essential that we continue to build reciprocal relationships that recognize the generous and resilient cultures of the First Peoples who've been here for millennia and to take their direction. Vancouver's Reconciliation journey is just beginning, and this work is inextricably linked to resilience in our community.

Equity

In Vancouver and around the world, resilience is inextricably linked to equity, and inequity (racial, gender, social, economic) is identified as a critical factor degrading the health and well being of communities and preventing progress on sustainability and disaster risk reduction goals. Truly advancing resilience means elevating and supporting people within our community that are most at risk, and have been systematically excluded from power structures for generations.

It's important to acknowledge that inequity and vulnerability to shocks and stresses is not an indication of a lack of personal resilience.

People that experience inequities demonstrate exceptional personal resilience every day, and have fought hard for many of the progressive values we claim today. Learning from these experiences and empowering these people can not only reduce risk, but it can foster better outcomes and communities for all people.

“To the extent that we are progressive and resilient today, it is because of people that stood up and fought for what is right.”
- Community voice

While the Resilient Vancouver Strategy engaged with thousands of people and directs many actions towards equity-seeking groups, we also recognize that we were unable to reach many underrepresented groups, or to provide safe spaces for learning.

In the next iteration of this work, Vancouver will seek input from diverse community members and groups to meaningfully integrate Reconciliation, Accessibility, and Social, Racial and Gender Equity into resilience efforts. This includes disaster and climate preparedness, mitigation, adaptation, response and recovery. Moving forward, as Vancouver's Equity Framework evolves, the resilience team will revisit and reassess our work, guided by the learnings of this process, as well as any emerging principles and accountability mechanisms.

Environmental Sustainability

The health and wellbeing of Vancouverites relies on the health and wellbeing of our natural environment. Regeneration of natural systems, adaptation to climate change, protection of biodiversity, and ongoing efforts towards climate mitigation are core to a resilient future. Vancouver has a strong foundation to build on this regard, and must continue to lead, act and advocate for bold innovation and action locally and globally.

Reciprocity

This is a strategy built on partnerships. It has been supported by local knowledge and global networks. Strong, trusting relationships and diverse perspectives are central to the capacity to solve tough problems. As a City, Vancouver has convening power and influence, and we can and should leverage this to support reciprocal partnerships. In our relationships and engagements we must avoid simply extracting knowledge, and instead use these opportunities to build the capacity of our community and recognize and value the resources contributed by many groups and individuals to make our city a better place.

Building Resilience in Vancouver – Strategy Overview

Priorities and objectives of the Resilient Vancouver Strategy are listed in the table below.

Priorities	Objectives
1. Thriving and Prepared Neighbourhoods	1.1 Cultivate community connection, stewardship and pride
	1.2 Empower communities to support each other during crisis and recover from disasters
	1.3 Transform the way community understands and prepares for local risks and hazards
	1.4 Strengthen social and cultural assets and services
2. Proactive and Collaborative City	2.1 Elevate equity-seeking groups through resilience initiatives
	2.2 Shape an inclusive city that can adapt to change, recover from shocks, and turn challenges into opportunities.
	2.3 Strengthen organizational capacity to manage risk and recover from shocks and stresses
	2.4 Advance holistic, collaborative disaster risk reduction and recovery planning
3. Safe, Adaptive Buildings and Infrastructure	3.1 Improve building performance to protect lives, decrease displacement, and accelerate recovery following an earthquake.
	3.2 Plan, design and upgrade civic facilities to serve the current and future needs of our diverse communities and ever-changing environmental conditions
	3.3 Anticipate threats, mitigate and minimize disruption to civic infrastructure and critical services
	3.4 Promote regional collaboration to assess, finance and fortify lifeline infrastructure and supply chains

Table 6: Priorities and Objectives in Resilient Vancouver Strategy

The Resilient Vancouver Strategy honours and builds upon the deep knowledge and generational work of community members and organizations, businesses, institutional partners and city government to understand and address pressing urban issues. It is not the intent of this strategy to duplicate that work, but rather, to elevate and learn from it.

This strategy is built on the premise that in our complex world shocks and disasters are inevitable, and that actions to reduce risk must also contribute to resilience day-to-day. The strategy recognizes the need for coordination to seek and invest in co-beneficial actions and to empower partners and communities to participate in this work.

The following sections present an overview of priority areas and objectives, along with a description of highlighted actions. A full set of proposed actions is included in Appendix B.

Actions were generated with input from community, external stakeholders, experts, staff, best practice and other cities working to address similar resilience challenges as Vancouver. Proposed actions were evaluated based on anticipated impact and feasibility, stakeholder input and support, and evidence and best practice.

Pending Council direction, staff will refine and complete the strategy for publication and release, and work across departments and in coordination with the City Wide Planning process to achieve objectives and implement actions.

Resilience Priority 1: Thriving and Prepared Neighbourhoods

Neighbourhoods are the intersection of social and economic life, and are where shocks and stresses play out in the lives of our residents. In Vancouver the strength and flexibility of our social fabric is critical to supporting residents and businesses day-to-day, and essential for the healing and recovery of our city when faced with disasters.

While resilience is often thought of in the context of disasters, we heard clearly from community that it starts by strengthening relationships and empathy among diverse neighbours; and grows through opportunities to share knowledge, contribute to local decision making, and collectively solve problems and work together to care for local spaces.

The four objectives in this section recognize the foundational role of community relationships and connections, the importance of robust cultural and social infrastructure, and the need to leverage local knowledge and creativity to prepare for and recover from shocks and stresses.

Objective 1.1: Cultivate Community Connectedness, stewardship and pride

We can build stronger neighbourhoods on an everyday basis and in times of crisis by empowering diverse residents to share their knowledge and play a meaningful role in shaping our city. By making space for dialogue, engaging newcomers in civic innovation, and supporting neighbourhood-driven resilience initiatives, we can weave a social fabric that is inclusive and strong enough to withstand the greatest challenges.

Objective 1.2: Empower communities to support each other during crisis and recover after disasters

Place-based planning and response networks are an important complement to government emergency plans and operations – especially when it comes to reaching vulnerable people at

critical moments right after major disasters, and helping each other to recover afterwards. In the event of disasters, many people will turn first to the organizations that they frequent and trust for safe and accessible care. Local organizations and businesses that serve their community day-to-day are uniquely positioned to assess and address the impacts that their communities may face during crises, and with the right support can mobilize to save lives and hasten recovery.

Objective 1.3: Transform the way community understands and prepares for local risks and hazards

Motivating and empowering our community to act requires that information about risks and hazards is accessible, meaningful, and relevant. Leaders in this field are moving towards communication and engagement that fosters collective action and builds on lived experience. By leveraging the arts, technology and input and capacity of diverse people, Vancouver will embark on a journey to change the way we engage community in complex conversations about risk, and inspire action within neighbourhoods.

Objective 1.4: Strengthen cultural, social and civic services and assets

Day-to-day social and cultural assets, including many non-profits, provide services like translation, food programs, and childcare that all enable more people to participate in daily life, and to cope with shocks and stresses. We heard from many people that their personal resilience was bolstered by the support provided by social, cultural and civic services, and many concerns about the growing demand as inequity grows, and limited surge capacity to respond in large disasters. Embedding resilience into planning and delivery of social, cultural and civic services can ensure they can transform to serve our growing community in times of greatest need.

Highlighted Actions – Prepared and Thriving Neighbourhoods

The actions in the table below represent tangible opportunities to build resilience by addressing gaps in the near term and to contribute to Thriving and Prepared Neighbourhoods. Additional actions are listed in the table in Appendix B.

Action	Description
Establish Resilient Neighbourhood Living Labs	Residents and organizations have capacity and interest in designing and testing new ideas in the places they live, work and play. Staff will work with community partners and learn from other jurisdictions to create pathways and spaces for residents, businesses, and community groups to create and test ideas and interventions aimed at neighbourhood climate and disaster risk reduction.
Support a community-led Downtown Eastside Neighbourhood Disaster Response and Recovery planning process	Community organizations, neighbourhood service providers, emergency managers and first responders have expressed an urgent need for neighbourhood-specific disaster response and recovery plans in the Downtown Eastside that are flexible to a range of hazards, and that complement the City's formal emergency response programs. Staff are already engaging with residents and organizations in this area, and will continue to work with them to determine the best role for the City in this process.

Action	Description
Expand the Resilient Neighbourhood Program and Tool-kit through neighbourhood grant program	The Resilient Neighbourhoods toolkit, co-created with community partners, includes a suite of tools, ideas and exercises for all ages and abilities. Pending Council approval, staff will scale the Resilient Neighbourhood Program, and launch the tool kit and a small grant program to support neighbourhoods to convene and lead place-based resilience initiatives.
Engage artists to explore and inspire creative solutions to resilience challenges	Artists explore, interpret and spark dialogue about society's toughest challenges. In partnership with 312 Main and the City of Melbourne, Vancouver will host a creative lab with local artists, emergency managers and scientists to explore experiential and creative processes for engaging community in meaningful dialogue about disaster resilience.

Resilience Priority 2: Proactive and Collaborative City

The magnitude of the challenges Vancouver is facing exceed the capacity of any one entity or group to solve alone. Thriving in a rapidly changing future requires collaboration and commitment of people and groups as diverse and complex as the city itself. By engaging meaningfully with communities and facilitating external partnerships, Vancouver can learn from the knowledge and experience of local stakeholders and global cities. We can share and invest in new technologies and research, embed resilience into our planning processes, and adapt City systems to serve our community more equitably. Through a spirit of reciprocity, learning and innovation, the objectives and actions in this section promote reflection, foresight and partnerships to collectively imagine and strategically create a resilient city for all.

Objective 2.1: Elevate the voices of underrepresented groups to improve resilience outcomes

The implementation of this strategy offers an opportunity to intentionally amplify the voices of those that experience shocks and stresses most acutely, and to build capacity and support for their continued participation in civic processes. Empowering those that are underrepresented in civic processes and decision making has a resilience dividend for our entire community. This objective is not just about bringing more people to the table to participate in a process, this is about creating space for underrepresented groups to define the issue and change the process so that outcomes work for more people.

Objective 2.2: Shape a city that can recover from shocks, adapt to change, and turn challenges into opportunities

As Vancouver embarks on a City Wide Planning process, we have an incredible opportunity to learn from the past, and to embed resilience into the future of our urban fabric. Using new technologies and techniques we can anticipate trends and capture emerging economic opportunities. Through hazard modelling and scenario planning, we can proactively reduce risk for current and future generations.

Objective 2.3: Strengthen organizational capacity to manage risk and recover from shocks and stresses

A strong city government is essential for a resilient community. City operations, finances, and staff are all impacted by shocks and stresses. Coordinating internal efforts to manage hazards and embed resilience throughout the organization will bolster our capacity to anticipate and withstand inevitable shocks.

Objective 2.4: Advance holistic, collaborative disaster risk reduction and recovery planning

Pre-planning for recovery is essential to support communities to bounce-forward after a shock, to re-start the economy, and to achieve equitable outcomes through well-managed re-development. In the absence of a strong recovery framework, communities end up in reactive mode – making quick decisions without time to evaluate the long term consequences and reinforcing vulnerabilities through redevelopment. Capital and city planning processes provide an excellent opportunity for Vancouver to also consider how we might reimagine our city after disasters, and to ensure that we can emerge from crisis in a way that strengthens social, ecological and economic conditions.

Highlighted Actions – Proactive and Collaborative Government

The actions in the table below represent those that can be initiated in the near term to contribute to our Proactive and Collaborative Government. Additional actions are listed in the table in Appendix B.

Action	Description
Apply the UN Sendai Framework for Disaster Risk Reduction Framework to align with partners and embed leading practice	The UN Sendai Framework for Disaster Risk Reduction has recently been adopted by federal and provincial governments, and progressive cities around the world. The Sendai Framework sets out leading practices for a holistic approach to reducing risk for all-hazards through consolidated governance of risk reduction measures citywide, and resilience indicators and targets. By applying the Framework Vancouver will align with other regional partners and levels of government.
Implement state-of-the-art hazard modelling tools to reduce risk through land-use, zoning, and urban design	Vancouver is partnering with NRCan to create modelling tools that integrate hazard information into land-use planning and design. For the first time, planners will be able to proactively reduce risk from multiple hazards through site specific policy, planning and urban design. Vancouver will be the first city in Canada to have access to this tool, which will eventually become available nationally.
Deepen our understanding of the experiences of diverse women* in climate change and disasters	In conjunction with the Women Deliver conference, staff will convene an event and initiate a process to hear and learn from the experiences of women and girls (*including trans*, gender-diverse, 2-spirit people and cis women) as they relate to disasters, climate change and emergencies.

Action	Description
Create a regulatory framework for equitable post-disaster redevelopment in Vancouver	Cities and organizations that actively plan for recovery can achieve more equitable outcomes and opportunities for residents, reduce risk in the future, and prevent “Disaster Capitalism”. The City Plan process provides an excellent opportunity for us to also consider how we might reimagine and rebuild a city that can better serve us after a disaster, and to establish a regulatory framework to enable effective, responsible redevelopment.

Priority 3: Safe, Adaptive Buildings and Infrastructure

The natural and built environment are inextricably linked to the wellbeing of residents and the economy. From earthquakes to climate breakdown, Vancouver’s buildings, infrastructure and the services they provide face multiple evolving pressures and must transform to serve the changing needs of community. The regional and interconnected nature of our systems, not to mention the cost of failure, means that we have a vested interest in working with external partners, and ensuring local redundancies in the event of disasters.

With respect to earthquakes, building failure and collapse threaten lives, housing supply, affordability and the national economy. There are limited regulatory options currently available to make existing buildings safer or minimize the threat of displacement, but we now have the information we need to create targeted and effective policy. Vancouver must contribute to, and advocate for, the support and investment required to ensure that our buildings and infrastructure can provide safe, reliable services to residents and businesses today and under changing future conditions. Through the application of systems-thinking, and the use of new technologies and innovative policy, the objectives and actions under Priority 3 aim to actively reduce risk to critical infrastructure, buildings and services, while supporting the wellbeing of residents today and in the future.

Objective 3.1: Improve building performance to protect lives, decrease displacement, and accelerate recovery following an earthquake

A damaging earthquake will inevitably occur in Vancouver. Through targeted policy, incentives, advocacy and collaboration with the Province, Vancouver can initiate actions today that will substantially improve buildings, reduce risk for residents and businesses over the long-term.

Objective 3.2: Plan, design and upgrade civic facilities to serve the current and future needs of our diverse community and ever-changing environmental conditions

City-owned civic facilities include community centres, fire halls, police buildings, public works yards and libraries that provide important services day-to-day, and serve as critical coordination points for response and recovery the face of shocks and stresses. Investment in these facilities should be prioritised to reduce risk for our community, and design of the space must be flexible and adaptable to meet current and future community needs.

Objective 3.3: Anticipate threats and minimize disruption to civic infrastructure and critical services

The continuity of civic infrastructure and services is essential to the wellbeing of our community and our economy. Threats emerge not only from natural hazards, but from aging infrastructure,

technological changes, and intentional attacks. Strategically evaluating and investing in infrastructure can save money and lives, achieve co-benefits for community wellbeing, risk reduction and climate adaptation, and increase partnership opportunities, including eligibility for financing and grants from senior government.

Objective 3.4: Promote regional collaboration to assess, finance and fortify lifeline infrastructure and supply chains

The infrastructure supporting Vancouver’s supply chains are regional and vulnerable to a wide range of hazards and disruptions well beyond our jurisdictional boundaries. The robustness of local and regional supply chains has a direct impact on our national economy, and the ability of local residents to access critical services. The investment required exceeds the capacity of any one entity and collaboration is required to finance and build resilience of these systems. Globally and nationally, new financing mechanisms are emerging that should be explored for our region.

Highlighted Actions: Safe, Adaptive Buildings and Infrastructure

The actions in the table below represent those that can be initiated in the near term to contribute to Safe, Adaptive Buildings and Infrastructure. Additional actions are listed in the table in Appendix B.

Action	Description
Formalize a cross-departmental Resilient Buildings governance model	Seismic policy for buildings will not be effective or feasible if it does not support the needs of people today. This action is to establish a resilient buildings approach to support cross-departmental coordination on building regulation and policy development, considering multiple goals and challenges - including: housing and commercial space affordability, accessibility, seismic recovery, climate adaptation, energy efficiency, and heritage protection.
Complete seismic risk assessment and engage stakeholders to identify and evaluate risk reduction and policy options	The next phase of the seismic risk assessment includes scoping and conducting a social and economic impact assessment. Vancouver will work collaboratively with the Province, and learn from other jurisdictions, to create an engagement process to hear from a wide range of impacted people, with a focus on residents, tenants, businesses, and building owners at highest risk.
Explore options to accelerate upgrades or redevelopment for civic buildings critical to community response and recovery	New information about earthquake and climate risk and neighbourhood vulnerability will continue to be integrated into our existing gating process for prioritizing upgrades and redevelopment. Vancouver will explore options to accelerate seismic and climate retrofits and replacement of civic facilities to facilitate post-disaster response and recovery in the City’s highest risk neighbourhoods.

Action	Description
Map and design a resilient lifeline infrastructure network	<p>Our communities rely on a complex web of interdependent infrastructure and services. Not all infrastructure can withstand all threats, however a well planned network of resilient critical assets will significantly increase community preparedness and resilience. Through a coordinated approach we can facilitate access and services to key facilities, accelerate disaster response and recovery, and enable equitable distribution of resources in emergencies.</p> <p>Staff will work to map and assess feasibility for a prioritized, distributed network of shock-resilient lifeline infrastructure, including priority expansion of roads, bridges, hardened water and sewer and flood management infrastructure that will enable emergency service access and delivery of resources to resilient facilities and hard to reach areas. In particular, staff will explore the expansion of the dedicated fire protection system (e.g. along the Broadway corridor), as well as pump stations, and flood protection infrastructure. This approach can guide long-term capital investment, support strategic asset management and renewal, inform policy and regulation and create opportunities for partnerships, including external funding.</p>

Next Steps

The above summary provides an overview of the objectives proposed as a framework for the Resilient Vancouver Strategy and a selection of tangible actions that can be taken to advance resilience in the near term.

A number of near term actions and engagements, including a series of Resilience Walks in neighbourhoods through the month of May, a dialogue with Indigenous artists and knowledge holders, and a community side-event with the Women Deliver conference are scheduled to support continued learning and advancement of resilience objectives within community.

Staff have confirmed partnerships and resourcing for many of the actions. Others will be refined pending Council input and approval. Staff propose to refine and release the Resilient Vancouver Strategy Framework in June 2019. This will enable staff to focus on integration with the City-Wide Plan initiative and other key council priorities, and will support accelerated risk reduction actions, the community small grant program, and sustain and honour partnerships.

Pending council approval of the framework, staff will develop project plans, charters and reporting processes for priority pieces of work. Given the scope of the framework, it is anticipated that staff would report back separately on different aspects. For example, staff would report back on the Seismic Risk Reduction Policy independently from Resilient Neighbourhood work.

Governance

Collaborative implementation of this strategy will require a consolidated cross-departmental governance structure that supports staff and effective partnerships with community, other levels of government, academics, and stakeholders. The actions and objectives cut across multiple departments and initiatives, and create opportunity for alignment of efforts.

In particular, there is an opportunity to strengthen coordination across Sustainability, Emergency Management, Risk Management and Resilience, and to streamline risk reduction and adaptation efforts through City decision-making and planning processes. Pending council approval of this report, staff will proceed with the development of a governance framework for the strategy that supports alignment and integration across departments.

Finalizing the Resilient Vancouver Strategy

This report has focused largely on gaps. Vancouver is well positioned to address these gaps, and has many strong examples to build on. The final strategy document will also highlight case-studies and initiatives underway and planned in the city and across our community. Staff plan to leverage the launch of the Resilient Vancouver Strategy to engage the public in dialogue, and have a number of events planned targeting diverse groups.

Upcoming public engagement events include a series of resilience walks in local neighbourhoods in May, a Women in Resilience event, a knowledge exchange with Melbourne on creative methods of risk communication, a collaborative exercise with the Port of Vancouver. In September, Vancouver will host the Resilience-themed Union of BC Municipalities (UBCM) Conference, with a chance to share our knowledge and work with other municipalities and seek additional partnerships.

Public/Civic Agency Input

This strategy was informed by many sources of input over the two-year development period:

- Ongoing consultations with internal staff and experts in all City departments, from the initiation of the Strategy and to continue into implementation
- Consultation with over 2,000 residents and 500 stakeholders through interviews, focus groups, and a series of workshops
- Partnership with, Britannia Community Services Centre, Collingwood Neighbourhood House, 312 Main Community Co-op and Dunbar Community Centre Association and engaged with their communities to co-create neighbourhood scale initiatives
- Work with technical experts, academics, researchers, consulting firms, and engineers
- Collaboration with the Provincial and Federal Government Engagement with civic agencies including Vancouver Economic Commission, the Vancouver City Planning Commission, and Citizen Advisory Committees
- Best practices research of other jurisdictions, both within the 100RC network and world wide

Appendix A includes a full list of all organizations which have provided input.

Financial Implications

Strategy Implementation

The development of the Resilient Vancouver Strategy and all associated research and programs (seismic, neighbourhoods, infrastructure and financing) has been delivered by a team of 3 temporary staff, funded until the end of 2019. A grant received through the 100 Resilient Cities supported the salary of the Chief Resilience Officer through June 2019. This work has also benefitted from in-kind support from many partners.

Moving forward there is significant support for partnerships to advance this work, as demonstrated by the \$2.1 million leveraged to date, and further partnership and grant opportunities identified. Staff intend to continue to pursue funding partnerships and collaboration through implementation.

Many of the actions in the proposed strategy have a confirmed staff lead and implementing partners, and can be resourced within existing budgets and through strategic realignment of resources. However, certain activities will likely require new investments. For example, continuation of the work on seismic policy will require additional staff resources. Similarly, scaling the Resilient Neighbourhood Program, would likely require a small staff team with resources to support equitable community engagement and partnership development.

Staff will assess outstanding staffing and resourcing needs, as well as funding partnerships and opportunities, and incorporate any proposed investments into future operating budget recommendations.

Impacts to capital projects will be evaluated and integrated into the next 10-year Capital Strategic Outlook and 4-year Capital Plan (2023-26).

Funding Leveraged via 100 Resilient Cities Program and External Partnerships

As a member City for the 100RC program, Vancouver has already received significant value, including support from 100 RC staff and consultants, access to tools and resources to evaluate resilience, peer learning exchanges, and access to a digital community of global resilience experts and leading cities.

In addition, staff have actively sought out and leveraged grants and partnerships with many local partners. The table below lists the value of resources leveraged and committed to date.

Source	Value	Description
100 Resilient Cities	\$295,000	Grant - 2 year funding for Chief Resilience Officer
100 Resilient Cities	\$50,000	Services - technical support from 100RC staff for resilience assessment per agreement
100 Resilient Cities – Platform Partners	\$343,000	Services - Value to date of platform partner services, including private sector, non-profit and academic partners, funded directly through 100RC partnership
UBC – Sauder School	\$60,000	Services - Contribution agreement to support Preliminary Resilience Assessment & research
Natural Resources Canada and Global Earthquake Model	\$1,000,000	Services - Estimated value of research and modelling to date in support of seismic assessment
Building in Canada Program	\$400,000	Grant agreement - Value of grant for enhanced building study with UBC & Kinetica, coordinated by COV.

Source	Value	Description
EMBC	\$100,000	Grant - Funding to support RNP staffing and Disaster Support Hub initiative
Pathways to Disaster Risk Reduction	\$ 4,000,000	Forthcoming value of CSSP research and development to support hazard modelling, infrastructure analysis, risk communication, and city wide resilience planning.

In addition to the above, community members and partners have made significant and generous in-kind contributions that do not have a confirmed financial value, including:

- Hundreds of hours and significant in-kind contributions of space, time, knowledge and expertise from neighbourhood partners, residents and contributors to the Resilient Neighbourhood Program
- Team Canada partnership and collaboration – monthly calls and webinars with 4 Canadian Cities to share learnings, identify advocacy opportunities, and connect staff across departments and cities.
- Delivery of engagement events in partnership with SFU Public Square and Centre for Dialogue.
- Partnerships and collaborations with the Vancouver City Planning Commission
- Partnership with the Global Network for Advanced Management (UBC/Yale) to host a week of resilience events, studies and collaborations in Vancouver.
- Significant in-kind support from UBC School of Engineering, and local engineering firms to inform, refine and validate seismic assessment work
- Advisory hours from 100 Resilient Cities network experts
- Peer learning exchanges to Mexico City and New York City, funded by 100 Resilient Cities

Future Allocation of Neighbourhood Resilience Grants

The Resilient Neighbourhoods Innovation Fund contribution was approved by City Council on July 25, 2017 to support the development, pilot and launch of a neighbourhood resilience and emergency preparedness program. This pilot leveraged funding and in-kind contributions from local community organizations, Provincial and Federal governments, non-profits and academic institutions.

The approved Innovation Fund request included \$40,000 for Neighbourhood Preparedness Grants to be distributed to scale the Resilient Neighbourhood Program. Pending council approval, staff will finalize the Resilient Vancouver Strategy and launch it in conjunction with a small granting process. If approved, this would support neighbourhood organizations to convene and implement components of the Resilient Neighbourhood Tool-kit across the city, and increase the number of neighbourhood organizations prepared to mobilize to support resilience, response and recovery efforts. Staff would report back to council with the proposed recipients. The source of funds the Resilient Neighbourhoods Program Innovation Funding approved in 2017.

Legal Implications

The implementation of actions in the strategy, including related to seismic risk reduction, may include an assessment of current legal authorities available under the Vancouver Charter. The City will work collaboratively with the Province to achieve specific actions and objectives including exploring potential amendments to the Vancouver Charter to better equip the City with the necessary tools to achieve those actions and objectives

CONCLUSION

Building resilience in Vancouver will take committed partnerships, hard work, reflection and resources. However, it is a worthwhile investment that will have both near-term and long-term benefits for our city. While major hazards can seem like a problem for tomorrow, there are things we can do today to mitigate risks, prepare, and be able to recover after disasters. We need to focus on our biggest gaps and take action to enhance community capacity, strategically invest in infrastructure, embed resilience into City plans and processes, and plan proactively for a future that includes multiple challenges.

The magnitude of the challenges and changes we are facing extend beyond the capacity of any one group to address. Collaborative partnerships and broad perspectives are core to this work. By working with our partners, and elevating the voices of future generations, Vancouver is well positioned to advance the transformative change required to set the foundation for a resilient future.

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Contributors to the Vancouver Resilience Strategy

This Resilient Vancouver Strategy has been made possible with the support, dedication, expertise and commitment of over 2,500 individuals, stakeholders and organizations.

Our sincere thanks to all of those who have contributed.

Public:

- Over 2,000 members of the public who contributed their ideas and expertise during community consultations

Non-Profit and Community Organizations:

- 312 Main Community Co-op
- 411 Seniors Society
- Architectural Institute of British Columbia (AIBC) Post-Disaster Response Committee
- Arts House Melbourne and Refuge Team
- Association of Neighbourhood Houses
- Britannia Community Services Centre
- Building Resilient Streets
- California Earthquake Authority
- Collingwood Neighbourhood House
- Community Resilience to Extreme Weather (CREW) Toronto
- Developmental Disabilities Association
- Dunbar Community Centre Association and Dunbar Earthquake and Emergency Preparedness
- Earthquake Engineering Research Institute (EERI) BC
- Engineers and Geoscientists BC (APEGBC)
- Evergreen BC
- Future City Builders
- Global Earthquake Model Foundation
- KidSafe
- Neighbour Lab
- OurPlace
- San Francisco's Neighbourhood Empowerment Network
- SNAP Toronto
- The Thingery
- Vancouver Foundation
- Vancouver Society of Children's Centres
- Wellington Regional Emergency Management Office
- Women Transforming Cities

Academic Partners:

- Emily Carr University of Art + Design
- University of British Columbia
 - UBC Sauder School of Business
 - SCARP
 - Earthquake Engineering Research Facility
- Western University
- Institute for Catastrophic Loss Reduction
- Langara College
- Simon Fraser University

- SFU Radius Lab
- SFU Public Square

Public Sector Organizations:

- Building and Safety Standards Branch, Office of Housing and Construction Standards, Ministry of Municipal Affairs and Housing
- Emergency Management BC
- Natural Resources Canada and Geological Survey of Canada
- North Shore Emergency Management
- Public Safety Canada
- Vancouver School Board

City of Vancouver Affiliated Groups and Agencies:

- City Studio
- LGBTQ Advisory Committee, City of Vancouver
- People with Disabilities Advisory Committee, City of Vancouver
- Urban Indigenous People's Advisory Committee, City of Vancouver
- Vancouver City Planning Commission
- Vancouver Economic Commission
- Youth Advisory Committee, City of Vancouver

Private Sector Businesses and Organizations:

- ARUP Group
- Ausenco
- Building Owners and Managers Association BC
- Bush, Bohlman & Partners
- Glotman Simpson
- Greater Vancouver Board of Trade
- Insurance Bureau of Canada
- Read Jones Christoffersen
- Kinetica
- Sage on Earth Consulting

100 Resilient Cities Platform Partners:

- Center for Active Design
- Deltares
- Ernst & Young
- Global Network for Advanced Management
- Institute for State and Local Governance, CUNY (Equality Indicators Project)
- Urban Footprint

100 Resilient Cities Network:

- Team Canada: Calgary, Montreal and Toronto Resilience Teams
- Cities of Melbourne, Wellington, Mexico, Quito, Medellin, Athens, Christchurch, Los Angeles, Atlanta, San Francisco, Seattle, Boston, New York
- International Resilience Teams from other 100RC cities

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Complete List of Proposed Resilient Vancouver Actions

These actions, identified through consultation and research, are not exhaustive. They represent near-term opportunities to contribute to long-term resilience objectives and to embed resilience in civic and community processes.

Objectives	Actions	Lead City Department	Supporting Departments and External Groups
Priority 1: Thriving and Prepared Neighbourhoods			
1.1: Cultivate community connection, stewardship and pride	1.1.A: Promote open and ongoing dialogue about Vancouver's past, present and future	ACCS, PDS	Resilience, Civic Engagement and Communications, <i>community partners</i>
	1.1.B: Establish Neighbourhood Living Labs for residents to create and test to place-based resilience solutions neighbourhood	PDS, Engineering Services	Resilience, PDS, Park Board, Engineering, ACCS, OEM
	1.1.C: Promote Leadership Opportunities for Newcomers and Across Diverse Groups	ACCS, <i>Vancouver Immigration Partnership</i>	City Studio, ACCS, Park Board
	1.1.D: Identify and support participatory budgeting opportunities	FRS	Civic Engagement and Communications
1.2: Empower communities to support each other during crisis and recover from disasters	1.2.A: Partner with trusted organizations to deliver safe, accessible and appropriate care for residents during emergencies	OEM, Resilience	OEM, PDS, ACCS, VPL, Park Board, <i>community partners</i>
	1.2.B: Launch and scale the Resilient Neighbourhood Program and Tool-Kit with Grants	Resilience	OEM, PDS, Parks
	1.2.C: Create an assessment process for neighbourhood food resilience	ACCS, Resilience	PDS, OEM, RNP
	1.2.D: Support a community-led Downtown Eastside Neighbourhood Disaster Response and Recovery planning process	Resilience, OEM	ACCS, <i>Vancouver Coastal Health, Multiple community partners</i>
	1.2.E: Train and support staff at Community Centres and Libraries to participate in community disaster resilience	Park Board, VPL, ACCS	OEM, Resilience, PDS

1.3: Transform the way community understands and prepares for local risks and hazards	1.3.A: Engage artists to explore and inspire creative solutions to resilience challenges	Resilience	OEM, PDS, Resilience, ACCS, <i>312 Main, City of Melbourne</i>
	1.3.B: Elevate local knowledge and support residents to share and learn from lived experience	Resilience	ACCS, OEM
	1.3.C: Apply an intersectional lens to revise emergency and resilience education and engagement materials to be relevant and accessible for all Vancouverites	OEM	PDS, Resilience, ACCS, <i>EMBC</i>
	1.3.D: Launch a digital tool to help the public understand and prepare for earthquakes and climate change impacts	Resilience	EM, PDS, <i>Natural Resources Canada</i>
1.4: Strengthen cultural, social and civic services and assets	1.4.A: Evaluate resilience of social and cultural infrastructure and services in high risk neighbourhoods	ACCS, Resilience	Resilience, PDS, OEM
	1.4.B: Create a Capacity Building Action Plan and Non-profit Partnering Framework	ACCS	All COV departments working with non-profits
	1.4.C: Leverage investment in civic assets and infrastructure to create local economic opportunities	ACCS, REFM, FRS	Resilience, PDS
Priority 2: Proactive and Collaborative City			
2.1: Elevate the voices of under-represented groups to improve resilience outcomes	2.1.A: Elevate and incorporate Indigenous knowledge and culture through resilience work	Resilience	Intergovernmental Relations and Strategic Partnerships, PDS, OEM, ACCS, <i>Musqueam, Squamish and Tsleil-Waututh Nations, local Indigenous partners</i>
	2.1.B: Deepen our understanding of the experiences of diverse women and youth in climate change and disasters (<i>inclusive of trans*, gender-diverse, 2-spirit people and cis women</i>)	Resilience	ACCS, PDS
	2.1.C: Leverage Resilient Vancouver implementation to strengthen civic relationships and literacy	Resilience	Civic Engagement and Communications

2.2: Shape a city that can recover from shocks, adapt to change, and turn challenges into opportunities	2.2.A: Enable transformative city planning through strategic foresight and deep engagement	PDS	Resilience, Civic Engagement and Communications, HR, <i>Brookfield Institute</i>
	2.2.B: Implement state-of-the-art hazard modelling tools to reduce risk through land-use, zoning, and urban design	Resilience	Planning, Engineering, OEM, <i>Natural Resources Canada, ICLR, UBC</i>
	2.2.C: Create and test a Resilient Neighbourhood Design Framework	PDS	All departments
	2.2.D: Develop a dynamic city-wide building lifecycle database	DBL	IT, PDS, OEM
2.3: Strengthen organizational capacity to manage risk and recover from shocks and stresses	2.3.A: Align city governance, resources and policy related to climate hazards and earthquakes	Resilience, OEM, PDS	All departments for city-wide implementation
	2.3.B: Connect emergency management and business continuity planning processes	OEM, Risk Management	All departments
	2.3.C: Evaluate and embed resilience into financial planning	FRS	Resilience, PDS, REFM, Engineering, Park Board
2.4: Advance holistic, collaborative disaster risk reduction and recovery planning	2.4.A: Apply the UN Sendai Framework for Disaster Risk Reduction Framework to align with partners and embed leading practice	Resilience, OEM, SUS	PDS, Engineering, DBL, IT
	2.4.B: Create a regulatory framework for equitable post-disaster redevelopment in Vancouver	PDS	OEM, Resilience, DBL
	2.4.C: Support convening of a Business Recovery Roundtable	Resilience, OEM	<i>Board of Trade, Tourism Vancouver, BIAs, Simon Fraser University</i>
	2.4.D: Support the Pathways to Disaster Risk Reduction Collaborative Project	Resilience	OEM, PDS, Engineering, GIS, <i>NRCan, GEM, EERI, FBC, UBC, EMBC</i>

Priority 3: Safe, Adaptive Buildings and Infrastructure			
3.1: Improve building performance to protect lives, decrease displacement, and accelerate recovery following an earthquake	3.1.A: Complete seismic risk assessment and engage stakeholders to identify risk reduction and policy options for existing buildings	Resilience	DBL, PDS, Civic Engagement and Communications, SPAC, provincial government
	3.1.B: Formalize a cross-departmental Resilient Buildings governance model	DBL	PDS, Resilience, ACCS, REFM
	3.1.C: Advance performance-based design and recovery-based code requirements for critical buildings	DBL	Resilience, PDS, OEM
	3.1.D: Work with the Province to advance a regulatory framework for enhancing climate and seismic resilience of existing buildings	DBL	Resilience, PDS
	3.1.E: Create tools to support home and building owners to undertake critical upgrades	Resilience	DBL, OEM, PDS
3.2: Plan, design and upgrade civic facilities to serve the current and future needs of our diverse community and ever-changing environmental conditions	3.2.A: Integrate new information about neighbourhood hazard risks into decision making process for civic facilities asset management and seismic program	REFM	FRS, Park Board, VPL
	3.2.B: Explore options to accelerate climate and seismic upgrades for civic buildings that are critical to community recovery	REFM, FRS	Resilience, PDS, VPL, Park Board, VFERS, VPD, Risk Management, ACCS, OEM
	3.2.C: Continue civic infrastructure resilience and interdependency assessments with Public Safety Canada	REFM, FRS	FRS, Resilience, Engineering, VFERS, OEM
3.3: Anticipate threats and minimize disruption to civic infrastructure and critical services.	3.3.A: Develop a citywide framework for critical infrastructure management and decision making	Risk Management	Engineering, Resilience, REFM, PDS, VFERS, VPD, ACCS, OEM
	3.3.B: Establish risk assessment guidelines and recovery targets for critical infrastructure	Resilience	ENG, DBL, FRS, OEM, VFERS, PDS, REFM
	3.3.C: Map and design a disaster resilient lifelines network	Engineering, REFM	IT, OEM, Resilience, PDS, ACCS, Park Board, VPL
	3.3.D: Refine and test post-disaster assessment protocols for infrastructure and buildings	OEM	DBL, Engineering, REFM

3.4: Promote regional collaboration to assess, finance and fortify lifeline infrastructure and supply chains	3.4.A: Convene private and public sector experts to explore innovative financing options for resilient infrastructure	Resilience	FRS, PDS, <i>Evergreen, FBC</i>
	3.4.B: Evaluate the cascading impacts of coastal flooding at Waterfront Road	PDS	Resilience, OEM, ENG, <i>Port of Vancouver, 100RC</i>
	3.4.C: Share Seismic Assessment Process and Findings with Regional municipalities and infrastructure owners	Resilience	OEM, PDS, Engineering, REFM <i>regional partners</i>

City Departmental Acronyms:

- ACCS: Arts, Culture and Community Services
- DBL: Development, Buildings and Licensing
- FRS: Finance, Risk and Supply Chain Management
- HR: Human Resources
- IT: Information Technology
- OEM: Office of Emergency Management
- PDS: Planning, Urban Design and Sustainability
- REFM: Real Estate and Facilities Management
- VFRS: Vancouver Fire and Rescue Services
- VPD: Vancouver Police Department
- VPL: Vancouver Public Library

Other Acronyms:

- *BIA: Business Improvement Association*
- *EERI: Earthquake Engineering and Research Institute*
- *EMBC: Emergency Management British Columbia*
- *FBC: Fraser Basin Council*
- *GEM: Global Earthquake Model*
- *NRCAN: Natural Resources Canada*
- *UBC: University of British Columbia*

Note: External organizations are indicated in *italics*.

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