

# 100 Resilient Cities

## Preliminary Resilience Assessment

Wellington

29<sup>th</sup> June 2016





## MESSAGE FROM CO-CHAIRS OF THE STEERING GROUP

According to Māori legend, Wellington harbour was originally a lake. In the lake lived two taniwha called Ngake and Whātaimai.

One day, Ngake managed to jump over the edge of the lake into the sea, smashing open the harbour entrance as he did so. Later, his brother Whātaimai went to follow, but he became stuck. He died and turned to stone, forming an area that overlooks the central city.

Today's scientists tell the same story of upheaval differently. Certainly this is a spectacular place to live, at the edge of the world.

Wellington is “the coolest little capital in the world” and the centre of New Zealand. Wellington is compact, creative, and innovative, with a CBD that has more bars and cafes per capita than New York. Native wildlife is returning to our hills and harbour.

Over our history we have learned to live with many shocks and stresses, and we have designed and adapted our City accordingly. Already we've assessed 5000 buildings for seismic risk, strengthened reservoirs, painted tsunami lines and encouraged neighbours to get to know each other. There are other issues to face too; economic challenges, inadequate housing, and the huge matter of sea level rise. There's much more to do.

We want to share information and ideas globally so we applied to become a member of Rockefeller Foundation's 100 Resilient Cities. 100RC has led us through a process that systematically highlights future challenges for Wellington. I'd like to thank the many participants, local, regional, national and international, who have shared their ideas and time so generously. This process will prioritise our finite funding and the Resilience Strategy will inform our next ten year budget.

I am pleased to be introducing this Preliminary Resilience Assessment, which outlines our challenges and poses some key questions as to how we can become better placed to deal with them, so that together we can build Wellington's future wellbeing for the long term.

Kia kaha. Kia toa, Kia manawanui. Be Resilient.

Celia Wade Brown  
Mayor



Wellington has always been at the forefront of progressive change. From Nuclear Free to Smoke Free, lively debate has been encouraged and embraced as a key component of our vibrant and dynamic culture.

And now we are debating Resilience. Resilience is a complex concept that means different things to different people, yet everyone wants more of it. I have no doubt there will be further rigorous debate as we start to crystallise what Resilience means to the citizens of the Region.

The emergence of initiatives such as Sendai Framework for Disaster Risk Reduction show that resilience is now at the forefront of global thinking. At home, Central and Local Government have realised this, and the establishment of the National Science Challenges, QuakeCoRE and other initiatives marks a new, collaborative way of thinking that can only be good for New Zealand.

I am thrilled to be co-chairing the City's Resilience Steering Group with the Mayor. We now have over 85% of New Zealanders living in cities, and cities are ideally placed to be leading the charge on key challenges such as sea level rise, poverty and economic development.

This Preliminary Resilience Assessment is an important first step in addressing our overall direction. I am pleased that it recognises that resilience decisions must be based on sound knowledge, and freely admits where knowledge gaps exist. Wellington is uniquely placed with Universities, NIWA and GNS Science all willing to collaborate with each other and with others for the betterment of our communities.

What better place for a living laboratory of research and learning to support real decisions?

I am encouraged that the PRA acknowledges that true resilience needs partnerships at the local, national and international level. We are of course, the Capital City, and so uniquely placed for Local and Central Government, research agencies and communities to work alongside one another

Floreat Scientia – let knowledge flourish.

Professor David Johnston  
Massey University /GNS Science

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## Te Whanganui-a-Tara (Wellington)

*Sometimes it does us a power of good to remind ourselves that we live on two volcanic rocks where two tectonic plates meet, in a somewhat lonely stretch of windswept ocean just above the Roaring Forties. If you want drama - you've come to the right place<sup>1</sup>*

On a good day, it's easy to see why Wellington is rated the best little capital in the world. Blessed with a stunning natural setting, Wellington combines the sophistication of a capital and a big city economy, with the warmth and personality of a village.



On a bad day, that's debatable.



Often wild, but sometimes calm, Wellington's natural environment has always demanded that her inhabitants be resilient. Early Maori found the going tougher than the warmer climes of the Bay of Plenty and Waikato. And early European settlers weren't convinced either. James Cook never entered Wellington Harbour, worried about the Southerly wind, and the first European settlement near the mouth of the Hutt River was flooded within months, leading to settlers moving to Lambton Harbour – even though the land had not been sold by its Māori occupants.

<sup>1</sup> Sir Geoffrey Palmer, former Prime Minister of New Zealand

## Today's Wellington

We love living here, in New Zealand's second largest metropolitan area. Our region has kept its historic form, with growth being achieved through developments and linkages with the Hutt Valley and Porirua.

Wellington is the home of several academic, research, artistic and cultural organisations. Recent years have seen a new joint creative campus in Cuba Street. Victoria University is continuing to invest in new facilities and halls of residence.

Around half Wellingtonians are employed in knowledge intensive industries. Wellingtonians have the highest per capita income in New Zealand, and are the most qualified. Wellingtonians have always embraced diversity and connectedness.

Wellington is the Arts Capital of New Zealand, and enjoys a thriving outdoors scene. Wellingtonians have a keen sense of social justice and have often been at the forefront of social change.

Residents are highly mobile, and are drawn to work, live and play here because of our unique blend of economic, social, cultural and natural environments.

It hasn't all been music and light though. Wellington has confronted and adapted in times of economic and natural adversity. We've survived then thrived. We've not just rolled with the punches, we've anticipated them and either avoided them or taken early steps to minimise the damage.

Some of these punches have been obvious: living in an area of seismic activity with interesting weather keeps us on our toes. But other punches have been more insidious: growing gaps in income equality, cuts in Government spending and rising sea levels are less obvious and more complex stresses.

Today, indications are that Wellington is poised for a period of growth and prosperity. Now is the time for us to think about investing in our resilience - you make hay when the sun is shining because you can't make hay in the rain.



Wellington Region population 450,000	Wellington City 41% of Regional population
13% Maori, 8% Pacific, 8% Asian	80+ ethnic groups
184,000 dwellings	38% with degrees, highest in NZ
Younger than average Region for NZ	40% forecast population growth in CBD
23% born overseas	27% forecast increase number of dwellings
38% adults single	GDP \$18,333 million (8.4% of national GDP)



## Resilient Wellington

### Our challenge

We are seeking to determine those key facets of Wellington life in which we need to invest to assure Wellington's wellbeing in the face of shocks and stresses. We need to inspire people to want to join us in this challenge, and to take ownership of various parts of it. We want to partner with our communities, with business, institutions and Central Government, and we want to do this now, so that we are ready when we are confronted with the shocks and challenges.

The Sendai Framework<sup>2</sup> focusses communities around the world on risk reduction rather than emergency response. For coastal cities like Wellington, this coincides with the need to start adapting the City to the effects of a changing climate and sea levels. Around the world, it is suggested that half of the infrastructure that will be in place by the year 2050 hasn't yet been built.

This presents a unique occurrence – emergency responders, engineers and environmentalists are aligned. We have the chance to get Wellington right for our children and grandchildren – we must not lose this opportunity.

### Our goal

The aim of Resilient Wellington is to develop a strategy that will support Wellingtonians in growing their capacity to survive, adapt and thrive, no matter what chronic stresses and shocks we experience.

The initiative is managed from Wellington City but in close partnership with Porirua and Hutt City Councils and the Greater Wellington Regional Council. The New Zealand Transport Agency, The Wellington Region Emergency Management Office, Wellington Electricity and Wellington Water Limited are heavily involved.

A Steering Group with formal terms of reference provides oversight, strategic guidance and monitoring of the Strategy process. The Steering Group is co-chaired by the Mayor of Wellington and the Director of the Joint Centre for Disaster Research. Committee membership is at **Appendix A**.

Resilient Wellington is part of a wider global initiative bringing together 100 cities working on improving their resilience through shared analytical tools, processes and most of all through shared ideas and lessons learnt. 100 Resilient Cities (100RC) is pioneered by the Rockefeller Foundation.

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<sup>2</sup> <http://www.unisdr.org/we/coordinate/sendai-framework>, The United Nations International Strategy for Disaster Reduction



### **Our Preliminary Resilience Assessment (PRA)**

Resilient Wellington has a long term horizon, up to 100 years for some aspects. However the first two years will provide a critical catalyst and set the scene for the coming decades. An Agenda Setting Workshop was conducted in September 2015 as a preliminary step, and commenced proper with the appointment of a Chief Resilience Officer in December 2015.

This PRA report represents the outcomes of Phase I of the project. Phase II will focus on developing further insight and specific actions, culminating in the Wellington Resilience Strategy while acknowledging that there is already an abundance of work underway. The Strategy will be implemented in Phase III.

The PRA defines the key areas of focus for Wellington to become more resilient. These key areas are known as discovery areas.

Phase I also mobilises partners and stakeholders, to better socialise resilience, to assess the current state of knowledge, and to develop priorities and set direction for Phase II.

The PRA follows the 100 Resilient Cities model, adapting it where appropriate to reflect our city's unique culture and needs. We undertook the following analysis:

- Stocktake of actions currently underway and possible gaps
- Review of shocks and stresses relevant to Wellington today and in the future
- Assessment of the resilience of Wellington assets to those shocks and stresses
- Collation of people's views on resilience priorities and opportunities



### Our stakeholders

The analysis was undertaken primarily through in-person engagement with key people and experts and online engagement with the wider community through social media.

- 600 people received Resilient Wellington newsletters
- 170 people responded to the survey identifying key Wellington's resilience factors
- 160 people participated in the Agenda Setting Workshop
- 100 people discussed resilience with the CRO in one to one interviews
- 95 people participated in focus groups and workshops in Phase I

We have identified over 600 people in the Wellington region whose involvement is crucial to our resilience efforts. They include people in utilities companies, Councils, NGOs and volunteers, health workers, scientists, academics, businesspeople and others. We used the 100RC City Resilience Framework to ensure that we engage with people representing all aspects of resilience.

Establishing engagement proved to be more revealing than had been anticipated:

- Most people we approached were positive about being involved and could see the rationale for work around resilience.
- Resilience to Natural Disasters is one of the Government's eleven Science Challenges. Because of this, every CRI and university in Wellington is involved in resilience. However a lot of this effort appears to be uncoordinated.
- Many Government departments are involved, and at a relatively senior level. These departments seem to be enthusiastic about engaging with their local Council.
- The Regional Council, Porirua and Hutt City Councils were keen to be involved and continue to do so. The general sentiment was that arbitrary territorial authority boundaries should not determine resilience thinking.
- City Council officers have had a strong presence, and were very keen to see how the Resilience Strategy might overlap or contribute to other policy areas such as transport, social, heritage and housing.
- Private sector (infrastructure operators, tourism, insurance) and not for profit organisations (social and environmental focus) engaged deeply, creating a platform for resilience partnerships.
- Many stakeholders appear to have undertaken work or analysis, or possess data about resilience. Much of this work is not linked to other work, or not publicly available, or both.

The next section reports on what we learned from the stakeholders and experts and each of the tools we used. These learnings have informed the Discovery Areas.



## Learnings from Phase I

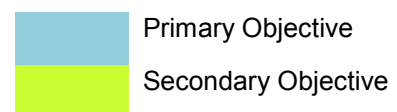
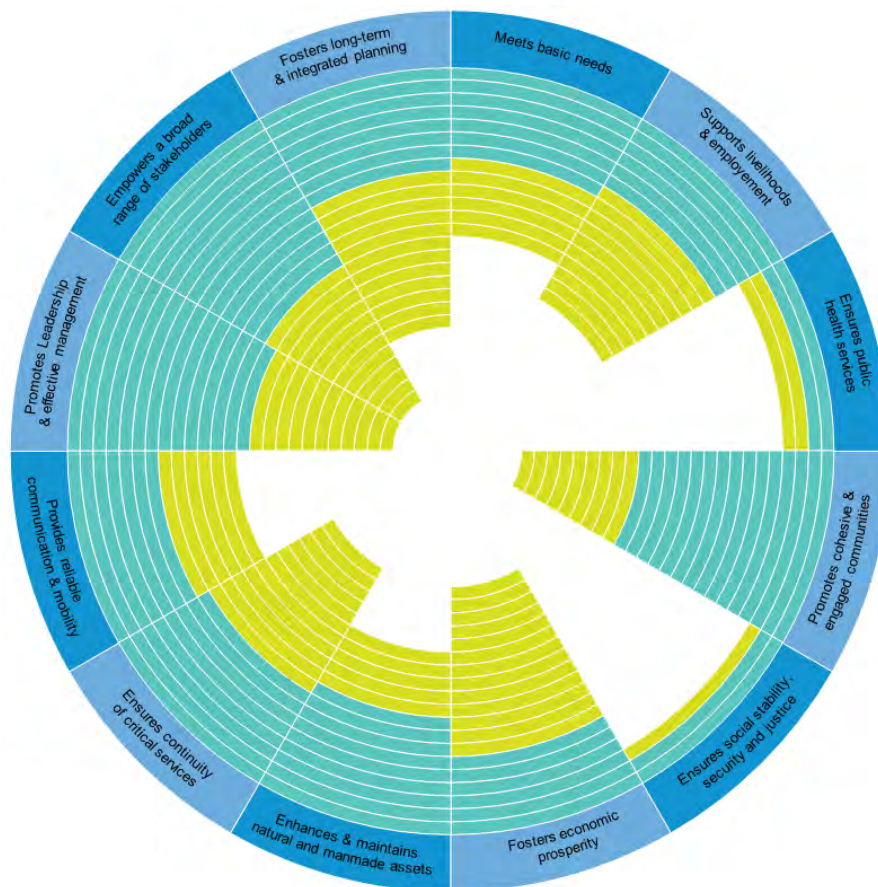
### Actions currently underway and possible gaps – what did we do?

At the Agenda Setting Workshop we asked our stakeholders to identify actions that are currently strengthening resilience of Wellington. The working group extended that list to all of the known activities being undertaken in resilience. These were mapped against the City Resilience Framework in order to determine any gaps or duplications.

### Actions currently underway and possible gaps – what did we learn?

There is a very substantial body of work already underway that is directly or indirectly related to resilience. This work does not need to be replicated. In many cases, it simply needs to be scaled up - a light shone on it, or linkages made to other initiatives that are occurring in isolation.

The areas worth investigating further are those that have been identified as priorities for improvement and the level of action is in the middle ranges, for example meeting basic needs for our most vulnerable communities, maintaining and enhancing natural and man-made assets, as well as communication and mobility.



## Review of Wellington’s Shocks and Stresses

The initial review of shocks and stresses was undertaken through a stakeholder survey and at the Agenda Setting Workshop. We then deepened our understanding through focus groups with asset managers and the research community.

### Shocks - what did we do?

We invited infrastructure providers from the electricity, water, roading and telecommunications sectors, and Council officers from the social and environment sectors to participate in a workshop to confirm Wellington’s main shocks in a systematic way.

The shocks with the highest risk were earthquake and storm, followed by medium risks of flooding (coastal and river), tsunami, water contamination, disease, terrorism and infrastructure failure. Urban fire was rated low risk, with the exception of post-earthquake fire.

### Shocks - what did we learn?

Earthquake is undeniably the most profound shock that Wellington faced in the past and will face again in the future. It clearly overshadows all other shocks.

As a result the conversations were overwhelmingly focused on seismic events, and seismic related events such as tsunami or post-earthquake fires. We are poorly prepared for the fires in urban areas as the response efforts would be hampered by both lack of water and traffic congestion. Interestingly conversations centred around response, emergency planning and the immediate action that needs to be taken after an earthquake. We are only beginning to explore the wider concept of resilience and recovery – what can we invest in today so that the effects of the earthquakes might be less traumatic.

Another force, comparable in scale to an earthquake, is climate change and sea level rise. Climate change is the source of the key shocks that are steadily increasing both in intensity and frequency – river and coastal flooding, land-slides, high velocity winds and disease outbreaks. Events like storm and related flooding will be faced by some parts of Wellington, and Hutt City in particular, on a regular basis and will be a significant source of disruption to the region.



## Building resilience to shocks

### Our fault

The Wellington fault cleaves the city of Wellington and the Hutt Valley. Although Wellington experienced a major earthquake in 1855, that event was caused by the Wairarapa fault, due east of the City.

While Wellingtonians are not strangers to small shakes, our local fault has lain inanimate for longer than the city as we know it has existed. Scientists estimate that the last movement of Wellington fault occurred between 300 and 500 years ago, long before the construction of cities and major infrastructure. A major earthquake along the Wellington fault today would have significant impacts for the region. The motorways and bulk utility lines for power and water cross the Wellington fault in multiple places - a significant earthquake is almost certain to disrupt travel, power, water, sewerage and communications.

When the Wellington fault ruptures, dramatic changes to the landscape are expected. During the Wairarapa fault rupture in 1855, parts of Wellington were uplifted so much that they were raised above sea level. For a Wellington fault event, much of the movement will be lateral-up and down the valley - but some areas will be lowered by as much as a meter, dramatically changing the shoreline area.

### Rising sea

In her report of November 2015<sup>3</sup>, the Parliamentary Commissioner for the Environment (PCE) noted that the sea level is expected to rise by about 30cm between 2015 and 2065. This is expected to change the frequency of coastal flooding from a 'once in a hundred year' event to '... once a year at the Port of Wellington'. As the Commissioner notes: "...we should see allowing new subdivisions on vulnerable coastal land as ... foolish'. Wellington has extensive residences, businesses and roads that are vulnerable. Sea level rise and coastal erosion are already a challenge for Wellington, however time is on our side, and we do not need to rush decision making.

The PCE also makes recommendations about clarification of the science to be used around predicted change to sea levels. A common view among scientists is that 0.8m in 2100 is a conservative but reasonable figure<sup>4</sup>. This is subject to change as we find out more and refine modelling.

A report commissioned by the Wellington City Council<sup>5</sup> noted that sea level is not a simple stress, and that there is no 'one size fits all' solution. It recommends the development of a Sea Level Rise Adaptation Strategy with proposed responses for different parts of Wellington. This has not yet been undertaken.

<sup>3</sup> [Preparing New Zealand for rising seas](#): Certainty and uncertainty, Parliamentary Commissioner for the Environment, November 2015

<sup>4</sup> [Climate Change Implications for NZ](#), The Royal Society of NZ, 2016

<sup>5</sup> [Sea Level Rise Options Analysis](#), Tonkin and Taylor, June 2013

## Reviewing Wellington's future stresses

### Stresses – what did we do?

A workshop was convened, attended by key players in the science and research communities, and others. We generated five hypothetical future scenarios to identify potential future stresses not currently considered. These scenarios are outlined below.

**Climate Change:** increased coastal and river flooding, storm severity, enhanced drought conditions with increased immigration

- failure to secure basic needs
- exacerbated flooding and wind hazards
- loss of supply chain
- social tension from ill-managed integration of climate refugees
- land use planning lagging behind in relation to rapid change in urban environment

**Governance:** Central Government moves out of Wellington; inefficient fragmented local Government

- fragmented decision making
- poor City - Central Government relations
- disconnected with global economy
- inefficient engagement with the community and other stakeholders

**Changing Demographics:** growing but ageing population, with increased immigration and religious cultural diversity

- poor social cohesion
- low productivity
- lack of affordable housing
- poverty
- lack of hazard awareness

**Smart Technology:** an explosion of data availability, increased use of automation and artificial intelligence

- lack of quality information due to poorly managed big data
- need for a rapid change in urban planning due to changing work patterns
- mismatch of skills and new technology resulting in shortage of skills and unemployment

**Transport Technology:** increased use of automated vehicles and public transport, underpinned by a move to alternative fuel sources

- need for rapid change in the transport and electric networks
- increasing cost of transport
- poor accessibility and connectivity

### Stresses – what did we learn?

Taking a long perspective helped us identify some stresses or threats that may not be present or acknowledged in the city at the moment. Considering future stresses can help identify actions needed to prevent those stresses arising or escalating. Possible stresses were:



- Lack of social cohesion, inequity and tension – this may result from poor integration of climate refugees, aging population, unemployment due to mismatch of supply and demand for skills, poor connectivity, housing affordability.
- Economic downturn – resulting from loss of supply chain, disconnection with global markets, lack of required skills and infrastructure to support smart technology markets.
- Underperforming urban form, transport and communication infrastructure – due to land planning processes and plans not keeping up with the need for rapid change, lack of quality decision-making resulting from an overflow of poorly analysed data.
- Failure of democracy – resulting in potential conflict with the community unwilling and unable to participate.



When focused back on the present day, coastal erosion caused by sea level rise is the priority concern expressed by workshop participants. Other stresses that keep these stakeholders awake at night relate to aging population, economic conditions, as well as poverty and inequality in income.

## Building resilience to stresses

### Housing

In order to prosper and be healthy, ideally Wellingtonians would all live in safe, warm homes, and have access to the basics of life. We do not like to see people being left behind, and we want all people to have fair access to safe, affordable and high quality housing.

Other than Council and State owned housing, we do not have a deep understanding of this challenge; however we do know that homes are damp and draughty, with consequential health issues. Low quality housing is very susceptible to the shocks and stresses that feature in this document. We know that around 6,000 households in Wellington spend more than 30% of their income on housing; this group is the most vulnerable to housing market pressures, and some are already be experiencing ‘rental stress’. Sea level rise is likely to depress coastal house prices, leading to further social challenges.

### Economy

Wellington is the economic hub of the Region. Wellington’s employment is around 7% of New Zealand’s employment, or 144,000 people. Wellington has around 26,000 businesses with a predominance of tech, scientific, and professional jobs, and has the highest median household incomes. As the seat of Government, it is the headquarters for the public sector and a wide range of private sector activity. Wellington is a major centre for digital industries, arts, culture, education and heritage.

We choose to live here because we love Wellington and we can make a living here. We all contribute to, and reap the benefits of, a thriving economy. Economic and population growth is expected to continue substantially over the next thirty years. This growth presents an opportunity to invest in resilience. Wellington’s contribution to New Zealand’s economy is substantial – yet we have only a cursory understanding of the economics of resilience, and need to undertake further analysis to understand the cost of investing (or not investing) in Wellington’s resilience.

### Assessing the Resilience of Wellington’s assets – what did we do?

A further workshop was run as an adjunct to the shocks workshop. For the purposes of this workshop, social and environmental domains were treated as ‘assets’ in the same way that hard infrastructure assets were assessed.

Assets were assessed against the priority (high risk) shocks identified in the previous section in order to determine the criticality of the consequences. While assessment was made for *survival* restoration times, focus was also on *operational* restoration times.

In addition, the Chief Resilience Officer met with a variety of involved and interested people to elicit their views and knowledge on resilience. A list of the organisations represented, including those who attended the Agenda Setting Workshop, is at **Appendix B**.

### Resilience of Wellington’s assets – what did we learn?

The workshop identified that on the whole the condition of our hard physical assets and their management was considered good or very good. The asset managers felt that in their current state our physical infrastructure was capable of withstanding the majority of shocks like floods, winds or fires. However earthquake is a shock to which our physical infrastructure is still very vulnerable.



The vulnerability of Wellington’s assets to earthquake is well summarised in a Lifelines report in November 2012<sup>6</sup>. The report is based on a major rupture of the Wellington fault line. The report acknowledges that there are many other earthquake scenarios.

Typically we have talked about *surviving* earthquake. We are now at the point, using the 100RC definition of resilience, where the focus is shifting to *thriving* after an earthquake. This is consistent with the intent of the Sendai framework, a UN initiative to which New Zealand is a signatory.

There are some key constraints with the built environment that currently inhibits our ability to thrive post-earthquake. These are summarised at **Appendix C**.

There was general agreement that building resilience to earthquake will strengthen resilience to other more frequent events like flooding and stresses like a future economic downturn. There are still significant actions that need to be taken to make sure that those assets withstand big shocks better and that their operation returns to normal so that the city can recover well.

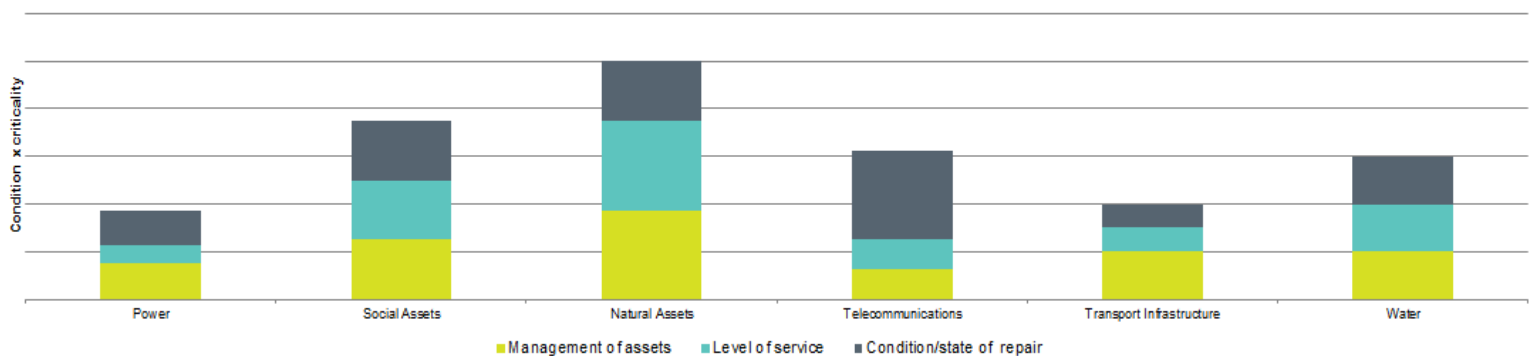
The earthquake is likely to be compounded by a secondary shock – most likely fire or tsunami. The proposed tsunami response is being incrementally rolled out in Wellington, however no recovery planning has been undertaken. No modelling has been undertaken for post-earthquake fire; this is an issue that will be compounded by a lack of water.

With some exceptions, Wellington’s geography is well appointed to drain heavy rainfall. The exceptions are mostly in isolated pockets, and don’t really constitute shocks for Wellington as a whole. The obvious exception is the floor of the Hutt Valley and the path of the Hutt River, where extensive development has occurred - and continues to occur - in areas where flooding is likely to happen.

Coastal flooding is an important issue throughout the Region, this will be compounded by sea level rise and changing weather patterns.

While much of Wellington is already constructed for dealing with strong winds, the effects of a changing climate may change the nature of wind. We do not yet understand what that means for the City and its infrastructure. We do not have a good understanding of the economic impact of storm related shocks.

City assets - condition weighted by criticality  
(scoring is relative - higher bar indicates asset requires greater attention)



<sup>6</sup> Lifeline Utilities Restoration Times for Metropolitan Wellington Following a Wellington Fault Earthquake. Report to the Wellington CDEM Group Joint Committee from the Wellington Lifelines Group, November 2012





The focus group participants recognised that the condition of Wellington’s social and natural assets needs much more attention. These assets were identified as critical to the Region’s resilience. Natural assets include our coast, reserves, harbours and the quality of our other green urban spaces. Social assets include the spirit and skills of our community, community groups and volunteers as well as the physical assets that support them, such as buildings and spaces. Both the natural environment and the people are what makes Wellington great. Natural and social assets are vulnerable to a wider range of shocks and stresses.

Discussions around infrastructure assets tended to focus on *asset management* rather than *levels of service*. The risk with this thinking is that infrastructure is planned in isolation from the needs of the community it serves. For example, the current operational electricity restoration time post-earthquake is 95 days for the CBD. This is unlikely to be acceptable for businesses in the CBD, especially those that have invested heavily in strengthening their buildings.

## Wellingtonians' views on resilience

### People's perceptions of resilience – what did we do?

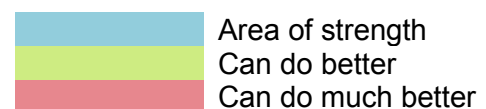
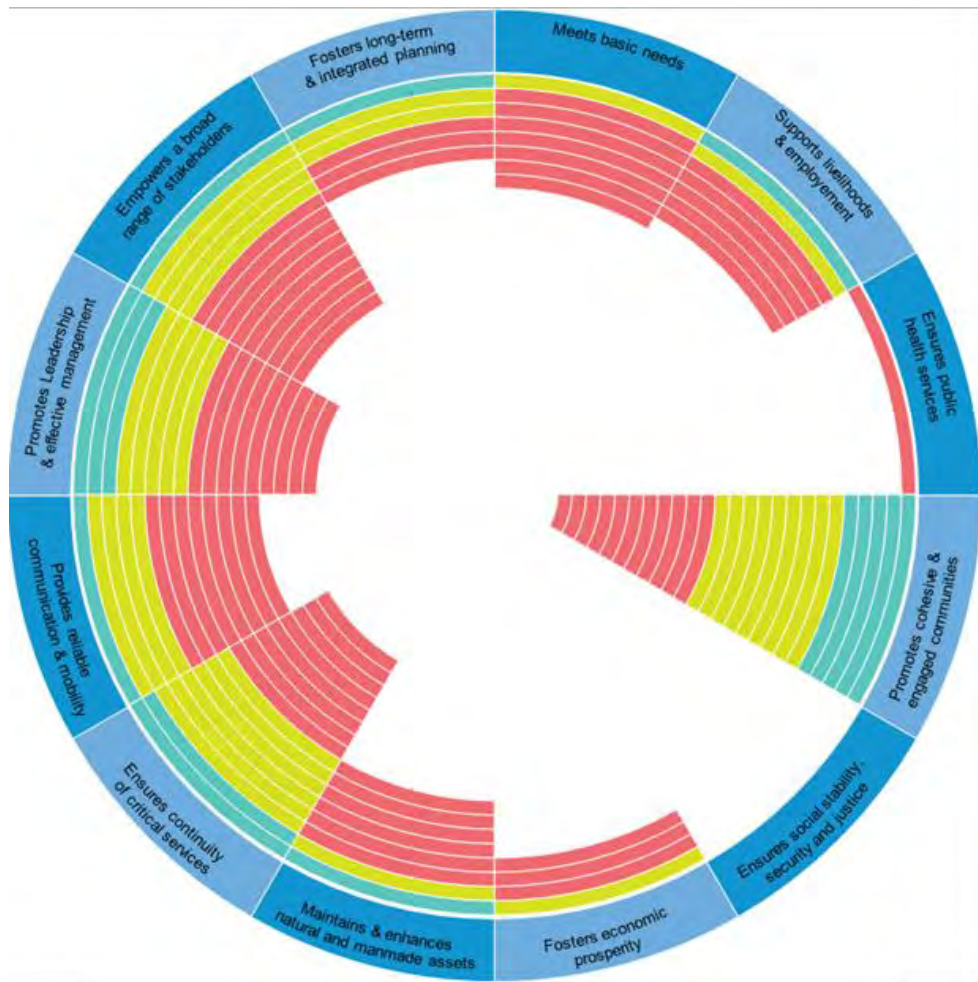
Wellington's Resilience Strategy can only be successful if it reflects the priority of all Wellington communities – asset owners, residents, business, local and Central Government. We engaged with those groups through workshops and surveys to generate a clear picture of:

- What they considered to be the main priorities for Wellington's resilience
- What are our current resilience strengths and weaknesses
- What should be the focus of the resilience strategy

At the Agenda Setting Workshop, attended by 160 people, we asked the participants to assess different aspects of Wellington's resilience. Their responses are reflected in the wheel below:



We ran an online survey where we asked people to identify Wellington’s resilience priorities. Over 170 people responded and their views are represented below, with the bars reflecting the number of people indicating that this should be an area of focus. Comments from the survey highlighted a strong community as a key factor to Wellington’s resilience.



We also conducted three workshops with key stakeholders; in Porirua, Hutt City and Wellington City. Using an appreciative inquiry approach, we led the participants through a process of identifying Wellington’s resilience strengths, developing a vision for the future and investigating the discovery areas for the strategy. A mural reflecting workshop participants’ contributions and insights is in **Appendix D**.

These workshops moved the focus from shocks and stresses onto identifying the key factors that make Wellington resilient. Participants built on the current and future strengths to identify the discover areas for the Resilience Strategy.

**People’s perceptions of resilience – what did we learn?**

There is a strong sense that Wellington’s resilience is well supported in meeting basic needs and supporting public health, security and justice and promoting cohesive and engaged communities. People saw it as important that there was equality access to a good quality of life, and that we needed to ensure that ‘no one was left behind’.

While an engaged and cohesive community was seen as an existing strength the workshop stakeholders still felt that further investment into this aspect of resilience was needed, as it was a fundamental element to our on-going prosperity and ability to thrive in recovery.





The three workshops featured rich and energetic debate, with extensive feedback and outputs. This can be summarised:

Correlation between resilience and sustainability.	<ul style="list-style-type: none"> <li>Using ecosystems as a defence for sea level rise</li> <li>Putting a financial value on the natural environment</li> <li>Linking climate mitigation with adaptation</li> <li>Decentralising infrastructure</li> </ul>
Adapt Wellington for climate change and sea level rise	<ul style="list-style-type: none"> <li>Communicate the science, educate</li> <li>Involve communities, initiating difficult conversations</li> <li>Land use planning</li> <li>Hard and soft defences, managed retreat in some cases</li> <li>Will we/how will we compensate property owners</li> </ul>
Governance and decision making	<ul style="list-style-type: none"> <li>Have clear vision, courage to make long term decisions</li> <li>Factor in resilience</li> <li>Regional not just Wellington City</li> <li>Community participation</li> <li>Bring the Big Picture to a more granular scale</li> <li>Multidisciplinary co-operation required, include business</li> </ul>
Social inequity	<ul style="list-style-type: none"> <li>Can we map this? What are the hotspots and ratios?</li> <li>Ensure people are not left behind</li> <li>Zero tolerance to loneliness</li> <li>What are our economic policies to address this?</li> </ul>
Community Health	<ul style="list-style-type: none"> <li>Consider health benefits in analysing infrastructure or housing</li> <li>Keeping healthcare accessible, especially for aged</li> </ul>

Infrastructure	<ul style="list-style-type: none"> <li>• How do we get away from cars?</li> <li>• How to use technology to help reduce infrastructure pressure?</li> <li>• How do we smooth public transport spikes?</li> <li>• Local energy generation is good for resilience.</li> <li>• Getting infrastructure to recover quickly post shock</li> <li>• Better connectedness to communities and cities in Wellington</li> <li>• What are people prepared to pay for?</li> <li>• Get away from engineering bigger and better infrastructure</li> </ul>
Spatial planning and urban design	<ul style="list-style-type: none"> <li>• Design resilience into Wellington – reduce risk by planning</li> <li>• Design emergency corridors</li> <li>• How plans cope with population growth and affordable housing</li> <li>• Design water storage into developments and buildings</li> <li>• Require energy conservation</li> <li>• Heritage resilience – focus investment on iconic buildings</li> <li>• Greening the City</li> </ul>
Access to warm, dry, energy efficient homes	<ul style="list-style-type: none"> <li>• Regulate bottom lines</li> <li>• Ensure connectness to economy and recreation</li> <li>• Improve the health of people through better homes</li> <li>• Range of options and prices to accommodate everyone</li> </ul>
Mana whenua	<ul style="list-style-type: none"> <li>• Touches every part of resilience – involve in governance</li> <li>• Can play a leading role based on tikanga/whanau</li> <li>• Connected to natural environment</li> </ul>
Connected communities	<ul style="list-style-type: none"> <li>• Payoff in emergency situation</li> <li>• Need to empower quiet voices</li> <li>• Must not be bureaucratic</li> <li>• Do not allow urban sprawl</li> <li>• Reduce the burden for Government</li> <li>• Celebrate all of our cultures, and <i>our</i> culture</li> </ul>
Economic resilience	<ul style="list-style-type: none"> <li>• Ensuring education, skills match our aspirations for a smart city</li> <li>• Demonstrate we are tech leaders – online smart City</li> <li>• Let's be visionary</li> <li>• Ensure our technology is resilient</li> <li>• Risks around automation for employment, and keep ahead of it.</li> <li>• Mechanisms and plans to enhance local production of food</li> <li>• Smart economic development that is mindful of resilience</li> </ul>
Earthquakes/ emergency preparedness	<ul style="list-style-type: none"> <li>• Turning data into stories for people</li> <li>• Investing now to make recover easier</li> <li>• Need to focus on pre disaster recovery planning</li> </ul>
Ageing population	<ul style="list-style-type: none"> <li>• Note our ageing population – what are the opportunities?</li> <li>• How do people age at home?</li> </ul>

## Wellington Maori – partners in resilience

### Engagement with Maori - what did we do?

Tangata whenua and other Maori people participated Agenda Setting Workshop, both as the hosts of Resilient Wellington and participants in the multiple workshops and individual conversations.

Ngati Toa and PNBST have been briefed on progress, and have been invited to participate on the Steering Group. The Tenths Trust has been briefed and is interested in resilience from an asset ownership perspective.

It is intended to commission formal advice from Ngati Toa and PNBST and, as the Resilience Strategy starts to firm up, to invite iwi to participate in the development of discovery areas and ultimately the Resilience Strategy itself.

### Engagement with Maori – what did we learn?

It is clear that the areas of focus for resilience are of interest to Maori in several dimensions:

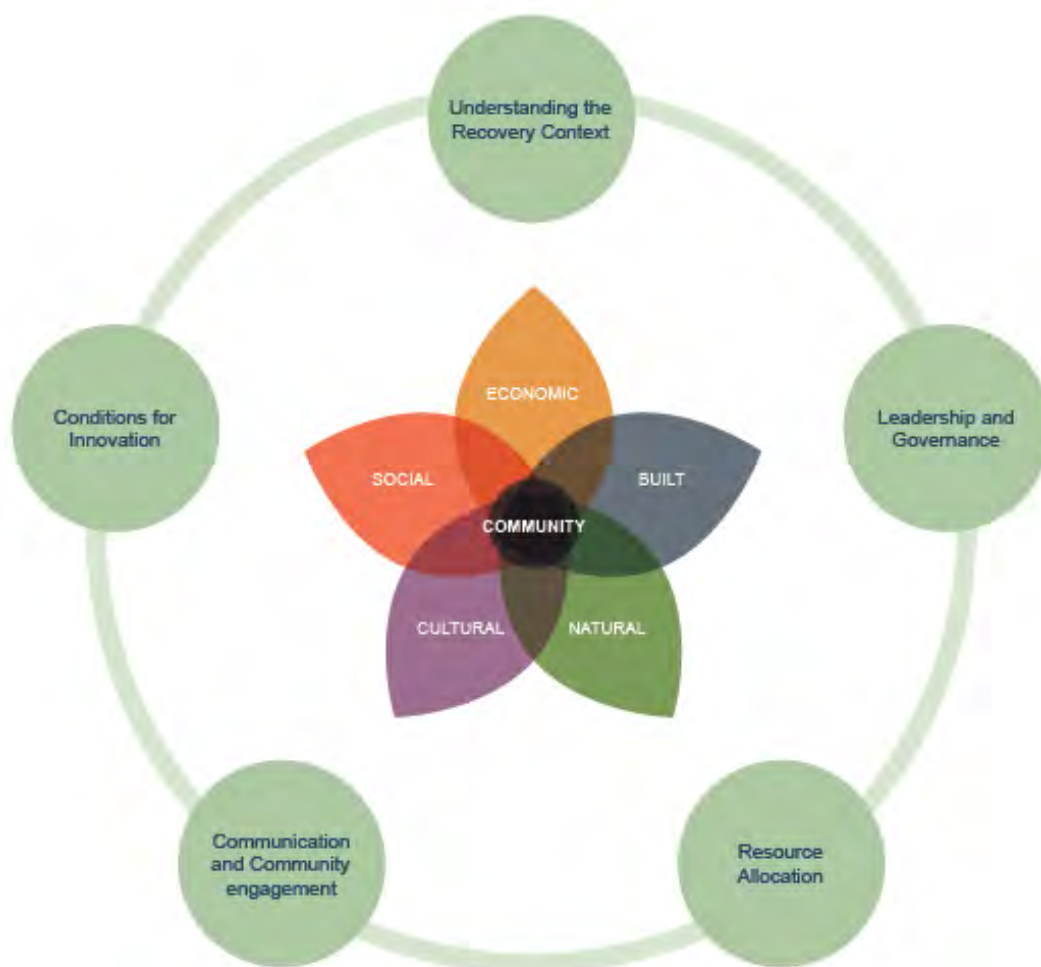
- Historically, tangata whenua have been at the forefront of Wellington’s resilience
- Kaitiakitanga, caring for our natural environment and waahi tapu, especially in the areas related to sea level rise, flooding and other natural hazards such as earthquake
- Maanakitanga, building unity through humility and the act of giving so that groups of Wellingtonians don’t get left behind as the Region prospers
- Papakainga, nurturing a place to which people can return home
- Iwi have substantial commercial interests in Wellington, and have a major stake in Wellington’s economic wellbeing

We need to keep working with Maori as we investigate the discovery areas and identify short and long term actions for Wellington’s resilience.

### Learning from Christchurch

In engaging with stakeholders, a couple of opportunities emerged that had not been identified through the 100RC tools and engagement process for Phase I. In particular there is a clear and important opportunity to understand what we can learn in Wellington from the Canterbury earthquakes and subsequent recovery process.

The Department of the Prime Minister and Cabinet is overseeing a significant project to ensure that key learnings from Canterbury are identified and imbued in policy and processes as appropriate. This is a significant undertaking and the key outcomes are to be structured as follows, due to be released in May 2016:



The petals form the basis for recovery planning in New Zealand, and are useful components for Wellington to consider as its Strategy develops. Wherever possible, we want to be consistent with national direction.



Key lessons for Wellington include:

### **Decision Making**

The Canterbury Earthquake Recovery Authority was a Government Department commissioned to make decisions around recovery, which were substantially funded by the Crown. Local Government struggled to cope with the intensity and complexity of the tasks at hand, and pre-existing stresses within Local Government were exacerbated by the shock of the earthquake.

Conversely, the pre-existing integration and focus of the Canterbury District Health Board were strengthened by the shock of the earthquake.

Whatever shape Wellington's Local Government might be in when we have our earthquake, Central Government will want a significant say as a funder, stakeholder and as residents.

We should prepare for this; for partnering with Central Government, with other Councils, with community groups, with businesses and with spontaneous groups.

### **Economy**

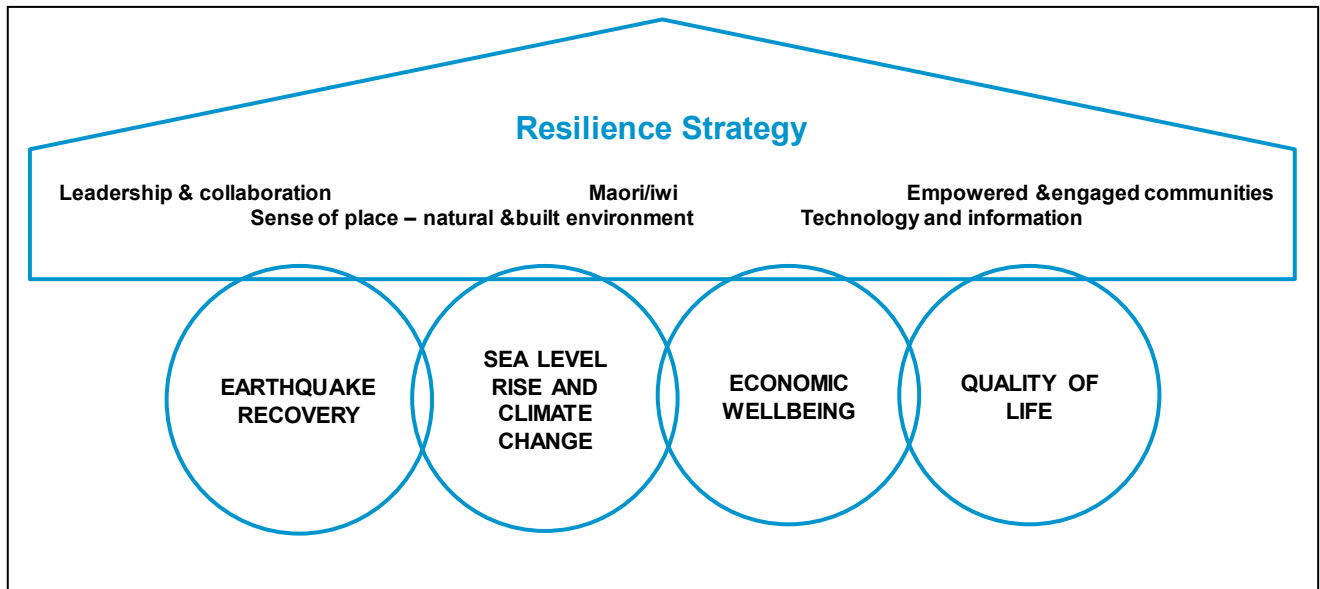
Central and Local Governments need to be clear on their role, and the role of business. In recovering a City, the economy needs to flourish. This means that businesses need to have the means to operate, albeit at a reduced level, then taking a lead role in planning for thriving after surviving.

### **Wellington is the Capital City**

This might seem obvious; however the public service mostly lives in Wellington and Members of Parliament spend much of their time here. There appears to be genuine willingness to engage around resilience; both Local and Central Government can do more to develop a partnership.

## Discovery Areas

The feedback and learnings to date have been distilled into four discovery areas for further investigation, and five issues that cut across all of the discovery areas.



The discovery areas are strategic questions that need to be investigated more deeply during the next phase of strategy development. They are designed to generate new options, strengthen existing solutions or find alternatives to intractable resilience challenges. Ultimately, the discovery areas will generate a suite of projects that will improve Wellington’s resilience.

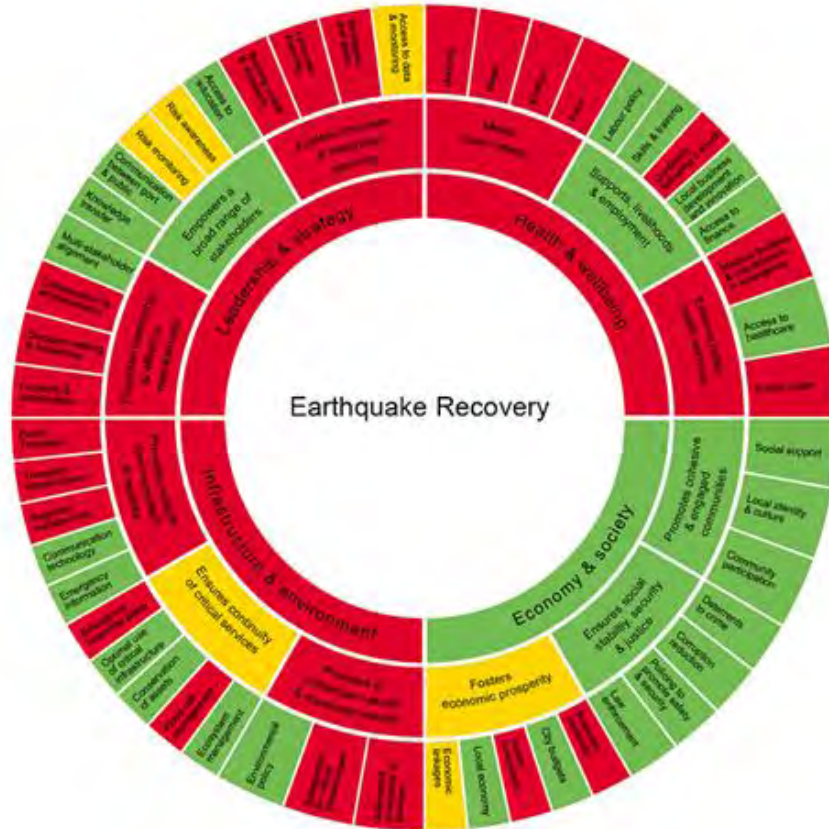
In the next section we present each discovery area which includes the vision, a scored CRF wheel and diagnostic questions. For planning purposes, the temporal horizon used was 50 years, with the exception of climate change and sea level rise, where it was 100 years.

Each discovery area has been assessed against 100RC’s City Resilience Framework to highlight the strengths that can be built upon, and the areas of weakness that need to be developed. Each indicator was assessed using a simple traffic light system where green = strength, red = opportunity for improvement, and orange = neither strength nor weakness. The scoring has been undertaken by the core working team in a workshop environment based on discussions undertaken with stakeholders during Phase I.

The first draft of the vision and diagnostic questions were developed by the core working team following the Phase I workshops. At the Challenge workshop, the discovery groups revised these using a structured challenge process which referenced the Resilience Dividend, the Resilient Lens and qualities, as well as the cross cutting themes. The challenge posters used to facilitate the process are attached in Appendix E.

### Recovery from a seismic shock

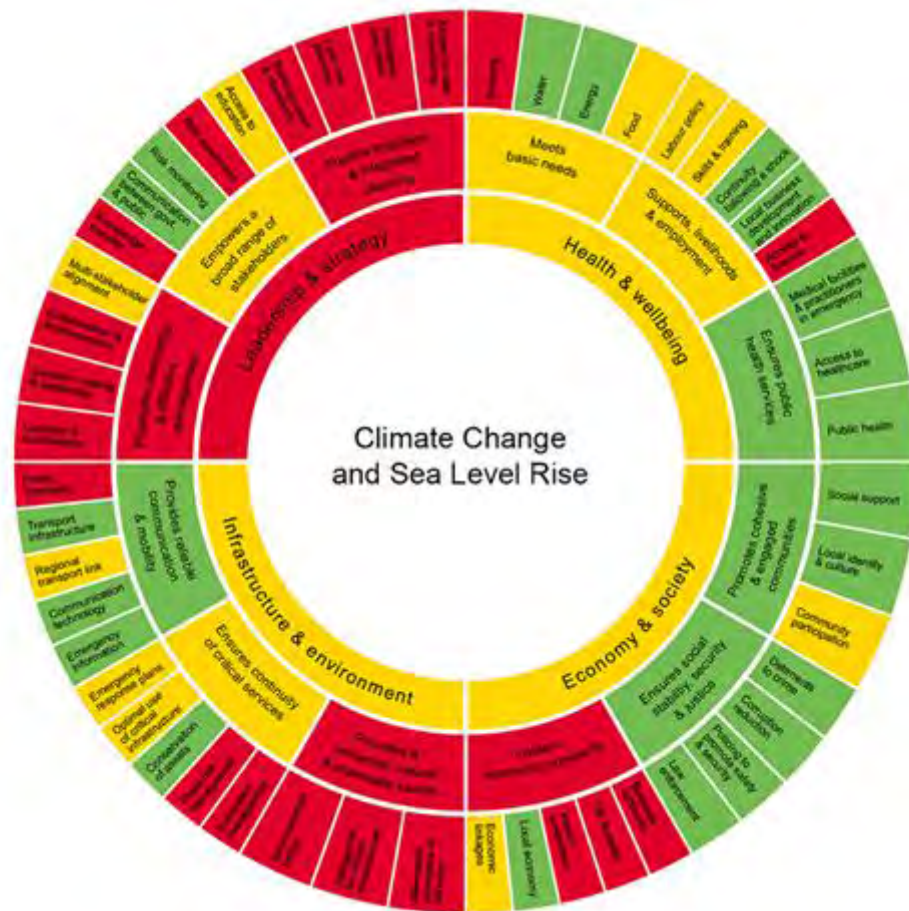
*Our communities, and the systems that support them, work together to adapt and grow stronger after a significant seismic event.*



- What does leadership and management need to do now to create effective partnerships and structures for recovery?
- How can we ensure our infrastructure is safe and functions after an earthquake?
- What community actions can be maximized to improve our disaster readiness?

### Climate change and sea level rise

*Adapt Wellington so that our residents, businesses, ecosystems and sense of place are prepared for the effects of sea level rise.*



- What are the long term principles that should drive a regional adaptation plan for managing the effects of climate change impacts? How do we embed these principles for the long term?
- How might our communities be engaged effectively to make the decisions we need to make? How can we learn from others' experiences?
- What are the high level natural, social, cultural and economic outcomes (cost-benefits) of adaptation and mitigation scenarios, measured against the cost and consequences of doing nothing?

### Economic prosperity

All sectors of our society are able to withstand a sustained period of economic adversity, such as a prolonged financial crisis. In particular, the CBD's vibrancy and creativity is underpinned by resilient infrastructure and communities.



- Acknowledging the role of the CBD, what are the challenges Wellington's economy faces and possible ways forward?
- How do we create a diverse economy that strengthens vulnerabilities, which embraces globalisation and builds self-sufficiency within the local economy?
- How can Wellingtonians collaborate, to support the continuity of, and grow the resilience of individual businesses and communities?
- How do we build capability and capacity to adapt to stresses in preparation for shocks and therefore promotes confidence in Wellington's economy?

### Quality of life

*All Wellingtonians enjoy access to healthy, resilient and affordable housing, employment and nourishment.*



- What does successful leadership and collaboration look like to ensure efforts across the region effect quality housing and livelihoods?
- How do we ensure everyone shares in a prosperous Wellington?
- As the Wellington region’s population grows, what does that mean for housing, existing infrastructure, natural environment and everyone’s quality of life?
- How might we use mapping to link hazards and socioeconomic statistics to influence decision-making to improve personal and community resilience?

### Next steps

The Resilient Wellington Strategy presents a unique opportunity to build on the wealth of work already undertaken. We are well placed to take a look at collective resilience building actions that will further benefit Wellington. In Phase II, we are forming groups which will investigate each of the four discovery areas we have identified. They will define our strengths and vulnerabilities in more detail and come up with short and long term actions that will improve the resilience of our region.

The working group and steering group will continue to work with and oversee these four groups – this will help to identify and exploit opportunities for synergy and collaboration and ensure the five critical foundations are incorporated.

The discovery groups will each pursue a rigorous and innovative process in Phase II, enabling Wellington to customise and narrow the focus into a time-bound scope of work. A range of partners will be engaged and this will intentionally signal areas of potential change in the final Resilience Strategy.

The opportunities identified will be prioritised to find those that will increase resilience across the whole of the city system by making it more reflective, robust, redundant, flexible, resourceful, inclusive, and integrated. We will be particularly focussing on the co-benefits of investing in resilience projects.

The Phase II activity will be articulated in a formal scope of work.





## Appendices

- Appendix A**    Steering Group members
- Appendix B**    Organisations in meetings with CRO
- Appendix C**    Earthquake Constraints
- Appendix D**    Mural
- Appendix E**    Challenge Posters



## Appendix A Steering Group members

<b>Name</b>	<b>Appointment</b>	<b>Organisation</b>
Celia Wade Brown	Mayor	Mayor
Professor David Johnston	Director	Joint Centre for Disaster Research
Elizabeth McNaughton	Executive Director (CERLL)	Department of the Prime Minister and Cabinet
Jo Taite	Chief Executive Kaihautu	Ngati Kahungunu Whanau Services
Colin Crampton	Chief Executive	Wellington Water
Tim Grafton	Chief Executive	New Zealand Insurance Council
John Milford	Chief Executive	Wellington Chamber of Commerce
Bruce Pepperell	Manager	Wellington Emergency Management Office
Alison Cadman	Chief Executive	Dwell

## Appendix B Contributors

AECOM	Inspiring Communities	RMS
Alliance	Joint Centre for Disaster Research	School of Medicine (Otago)
ANZ Bank	Kaibosh	Skylight Trust
Arts Access Aotearoa	Kapiti Coast Airport	Solity
Arts Wellington	Kapiti District Council	Stimpson and Co
Auckland Council	KiwiRail	Sustainability Trust
Business NZ	Land Information New Zealand	Sustainable Coastlines
Cable Car Co	Lions Club	T&T
CCDHB	Local Government New Zealand	Te Awakairangi Health Network
Centreport	Loomio	The Wellington Company
Chamber of Commerce	Massey University	Timor-Leste Community Policing Project
Chorus	MBIE	Transpower
Christchurch City Council	MCDEM	Treasury
Community Housing Aotearoa	McKee Fehl Ltd	Trinity Group
Community Law	Mckenzie Highan	TSA Oasis
Community Networks Wellington	Ministry of Education	Upper Hutt City Council
Community patrols	Morphum	Veolia
Compass Health	MSD	Victoria University
Corrections	NCSC	Volunteer NZ
Countdown	NEC	Volunteer Wellington
Deloitte	Neighbourhood Support NZ	WCC
Dept of Internal Affairs	Neighbours Day Aotearoa	WeLG
DOC	Ngāti Kahungunu ki Pōneke Community	Wellington Airport
DPMC	Night Shelter	Wellington City Mission
Dwell	NIWA	Wellington Electricity
EECA	NZ Fire Service	Wellington Employers Chamber of Commerce
Enspiral	NZ Recreation	Wellington Free Ambulance
EQC	NZIA	Wellington International Airport
First Retail Group Ltd	NZSEE	Wellington Lifelines Group, Lifelines
Foodstuffs NZ	NZTA	Wellington Māori Business Network
Garden to Table Trust	OraTairio: NZ Climate and Health	Wellington Timebank
GHD	Philanthropy NZ	Wellington Water
GNS	PNBST/Ngati Toa	Wellington Zoo
GWRC	Police	Wharton, University of Pennsylvania
Hospitality NZ	Porirua City Council	Whiterea Community Polytechnic
Housing NZ	RCA	WINTEC
Hutt City Council	Red Cross	WREDA
Hutt Valley Chamber of Commerce	Refugee Services	WREMO
Hutt Valley DHB	Regional Public Health	WWF
IAG	ResOrgs	Zeal Education Trust
ICNZ	Resourceful Planning	

## Appendix C Earthquake Constraints

Water. Up to 75 days to restore water for economic recovery is too long (50 days into the CBD). The asset manager (Wellington Water) has recognised this, has identified the potential gap in the level of service, and is currently working with asset owners to determine a course of action. The gap includes the known inability to use water to fight fires post-earthquake. Waste water has not yet been addressed.

Power. The asset owner estimates restoration of 60 days to most populated areas, and 95 days to the CBD for economic recovery. While incremental improvements are being made, the asset owner acknowledges that this is too long, but is unable to fund resilience through price due to the prevailing regulatory framework. Resilience investment has been stymied in this way for at least seven years.

While there is hope that the emergence of electric vehicle and battery technology might grow resilience, and new wood burners that might add another dimension, the pace of uptake of these technologies is largely unknown. However, resilience could be a driver to change behaviour and speed the uptake.

Access. Substantially access in and around Wellington means road access. A Lifelines report in March 2013<sup>7</sup> identified that progressive restoration would take up to 120 days, with WIAL towards the end of that time. The Transmission Gully project is likely to greatly reduce that time, by more than half, however this is still a long period of isolation. In practical terms this means that supermarkets will not be stocked, car use will not be viable beyond individual suburbs, and the CBD will not function. NZTA and GWRC are currently constructing a programme business case to set a blueprint for improving Wellington's roading resilience investment.

Telecommunications. A Lifelines report<sup>8</sup> concluded that the Wellington telecommunications sector is 'relatively resilient to hazard events', and 'the sector is so intertwined that no resilience improvements are immediately obvious'. The report does seem to focus on the immediate response to an earthquake rather than the economic recovery. It is intended to grow Wellington's CBD population substantially over the next 30 years, and that this will highlight the vulnerability of the CBD and Eastern suburbs following an earthquake. The core of this economic growth is the tech sector, and the finance and information services sector including banking.

Natural assets. We do not price our natural assets, and as a result we do not factor them into our planning. However, one of the main reasons people choose to live in Wellington is the natural environment, and research suggests that natural vegetation is strongly correlated with human wellbeing<sup>9</sup>. The natural environment is vulnerable to earthquakes, and an earthquake recovery presents opportunities to retain and improve the environment that attracts us here. There is also a strong school of

<sup>7</sup> Restoring Wellington's transport links after a major earthquake, Initial Project Report, March 2013

<sup>8</sup> Project report – 'Telecommunications sites recovery', August 2015

<sup>9</sup> Urban Vegetation, Wellbeing and Pro-environmental Behaviour: A Socio-ecological Experiment in Wellington City, New Zealand, J Whitburn, VUW, 2014

thought for natural assets to be used where possible to combat flood and sea level rise<sup>10</sup>.

Social assets. People are at the centre of everything. While this section has focussed on hard infrastructure, the only reason any of it exists is for the communities it serves. Repeatedly, connected and engaged communities were at the heart of debate around surviving in the face of shocks and stresses, then recovering and thriving after the shock or stress. Many times it was pointed out that fractured and fractious communities are further fragmented by a shock. Strong communities pull together and become even stronger. Resilient social assets are critical for a Resilient Wellington.

Commercial Buildings. Wellington’s work on earthquake prone buildings is highly regarded. In the central City, 5,500 buildings have been assessed, and 720 have been deemed earthquake prone and in need of structural changes. However the relationship between earthquake prone buildings and key lifelines is unclear. Additionally, the regulatory framework is based on building structure, but not the fitout and fittings.

Residential buildings. We know that investing a small amount of time and effort into fixing water cylinders, securing piles and chimneys is sensible. However there appears to be a very low takeup of these activities across the Region.

Heritage buildings. We do not have a clear prioritised listing of heritage sites from a resilience perspective.

A common assumption was that the Lifelines Group, Councils and the Resilient Buildings teams have Wellington prepared for an earthquake. Many participants were surprised to learn of planned restoration times, and other issues emerged during the course of phase I:

Customer focus. In general, for key infrastructure restoration times have been determined by the asset owners, rather than their customers. Current restoration times are likely to force businesses to relocate, most likely to outside the Region.

Growth. As we grow Wellington by 50,000 over the next 30 years, the City must take the opportunity to grow infrastructure that is more resilient to earthquake.

Interdependencies. To date, asset owners have concentrated on their own assets. But there has been little attention to date on the relationship *between* assets. This gap was known in 1993<sup>11</sup>. Despite significant technological advances, Wellington has only made modest progress in this area.

Planning. Other than the Government’s National Plan<sup>12</sup>, there is no response plan for the Wellington Earthquake. There is no recovery plan at any level. IPENZ released a report in 2012<sup>13</sup> recommending regulatory change to require infrastructure owners to be accountable for resilience planning, citing: “The current approach involves too much discretion and essentially relies on voluntary efforts.”

<sup>10</sup> Adapting to the consequences of climate change, Engaging with communities, New Zealand Coastal Society 2016

<sup>11</sup> Wellington Earthquake Lifelines Group, 1993 Report, November 1993

<sup>12</sup> Wellington Earthquake National Initial Response Plan Supporting Plan [SP02/10] 28 April, 2010, Version 1.0

<sup>13</sup> A Safer New Zealand, Reducing our Exposure to Natural Hazards, October 2012, IPENZ/Engineers New Zealand

Lifelines reports. Lifelines reports are well commissioned and received, however they are rarely presented to Councils, and accountability for recommendations is unclear. There is a gap between the technical information and decision makers.

Information. Substantial effort has been invested in developing hazard maps and other information, for example liquefaction zones, inundation zones and ground shaking areas. While this information is discoverable, it is not proactively made public, allowing people and communities to make choices based on the known information.

Waste. Waste has not been mentioned in the Lifelines reports – mainly because waste is dependent on water and transport to flow. In practical terms, waste disposal could be unavailable for up to 75 days. In the CBD in particular, the City is ill prepared for that level of waste.

Insurance. The insurance sector takes a clear and simple view of earthquake risk, and understands the relevant losses and risk. This does not really extend to economic risk however. A report to the Lifelines Group<sup>14</sup> estimates \$12bn in building and infrastructure damage, but annual GDP loss of \$10bn.

The report, which is very high level only, estimates that a relatively small investment (of perhaps \$3-\$4bn) could greatly reduce this liability. Below the highest level analysis, we do not have a good grasp on the economics of resilience for Wellington. We do not understand the cost of doing nothing, for example.

New Zealanders are heavily insured, and culturally expect that an external agency will provide support in a shock or stress.

Of course, we could simply choose to do nothing, to accept the risk of earthquake and to live with it. However the moral implications of doing nothing are quickly outweighed by the advantage of doing something.

Central Government. The Government's Wellington Earthquake National Initial Response Plan contains this text for the Prime Minister to use in extreme circumstances (like an earthquake):

*Government has relocated to [insert town] so that we have the necessary electricity, telecommunications and other utilities that we need to function and to lead the response.*

This scenario is not far-fetched. We have some work to do; as Wellington grows and flourishes, we need to our businesses, communities and agencies to pay particular attention to resilience so that Wellington not only survives, but thrives after an earthquake, or any other event.

### **Relationship with other shocks**

Infrastructure that is resilient to earthquake is generally also resilient to some other potential shocks, including infrastructure failure, water reservoir/intake contamination (other than sabotage), and fire. It is acknowledged that our infrastructure is not yet sufficiently resilient to earthquake.

The earthquake is likely to be compounded by a secondary shock – most likely fire or tsunami. The proposed tsunami response is being incrementally rolled out in Wellington, however no recovery planning has been undertaken. No modelling has

<sup>14</sup> Wellington – essential to NZ's Top Tier, Its resilience is a national issue, BERL, December 2015

been undertaken for post-earthquake fire; this is an issue that will be compounded by a lack of water.

### **Severe storm**

With some exceptions, Wellington's geography is well appointed to drain heavy rainfall. The exceptions are mostly in isolated pockets, and don't really constitute shocks for Wellington as a whole. The obvious exception is the floor of the Hutt Valley and the path of the Hutt River, where extensive development has occurred - and continues to occur - in areas where flooding is likely to happen.

Coastal flooding is an important issue throughout the Region, this will be compounded by sea level rise and changing weather patterns.

While much of Wellington is already constructed for dealing with strong winds, the effects of a changing climate may change the nature of wind. We do not yet understand what that means for the City and its infrastructure, although resilience to wind has a strong correlation with resilience to earthquake..

We do not have a good understanding of the economic impact of storm related shocks.

### **Disease outbreak**

In late 1918 New Zealand lost half as many people to influenza as we lost in the whole of World War 2, around 9,000 fatalities.

While we know that another shock of this type is possible, we do not have a clear picture of what it means for Wellington.

### **Terrorism**

As for disease outbreak, we have little knowledge of this shock. This is not a reflection of its importance, although we need to acknowledge that there are Government Departments that are very focussed in this area.

Appendix D – Resilient Wellington Mural



# Discovery Area: Earthquake Recovery

## Your Challenge

To refine diagnostic questions (areas of focus for investigation and initiative development for your Discovery Group), and cross cutting themes (areas of synergies and co-benefits across all Discovery Areas)



**1.** 1) Discuss and refine the following vision (5 minutes):

**Vision**

Our citizens, institutions, businesses, and systems will function well and grow stronger in recovering from a severe seismic event, such as earthquake, tsunami, a combination of earthquake and tsunami and post-earthquake fires.

**2.** 2) In bullet points, begin to define the challenge and tell the story: (10minutes).

**Background**



**3.** 3) Discuss what should be group's focus for investigation and initiative development. Choose three of the current diagnostic questions with the highest resilience dividend potential? Note them down, amend if necessary. Describe the co-benefits and the dividend. Are there other questions that could lead to actions with higher dividend? (20 minutes)

**Resilience Dividend**

Which part of the city system do we need to focus on to generate the greatest resilience dividend?

During the Phase I we reviewed existing actions, and we asked the stakeholders where we need to focus, where is the biggest opportunity for improvement, where are our key weaknesses and strengths.  
Red - can do much more, Yellow - can do more, Green - doing well

**4.** 4) Discuss the cross-cutting themes. Choose three of the current diagnostic questions that best address the cross cutting themes. Note them down and amend as you agree. Are there other questions? (15 minutes)

**Cross Cutting Themes**

Earthquake Recovery	Climate Change and Sea Level Rise	Economic Prosperity	Quality of Life
<b>Cross cutting theme</b>		<b>Diagnostic Questions</b>	
<ul style="list-style-type: none"> <li>Engaged and empowered communities</li> <li>Maori knowledge and perspective</li> <li>Leadership and collaboration skills</li> <li>Sense of place: natural and urban form</li> <li>Technology and information</li> </ul> <p>Cross cutting themes: highlight strategies and potential equity areas that can generate synergies and co-benefits across the city system and build resilience to all types of shocks and stresses.</p> <p>Other cross cutting themes?</p>			

5) What do we focus on? Revise diagnostic questions based on your discussions in task 3 and 4. Narrow down diagnostic questions - 2-6 questions. Record in Draft 2 (20mins)  
6) Cross cutting group exercise - present to the group, take relevant questions to a cross cutting theme tables (40mins)  
7) Revise your diagnostic questions incorporating feedback from cross cutting theme discussions. Draft 3 (10mins)

<b>Diagnostic questions</b>	<b>Resilience dividend</b>

**Diagnostics Questions**

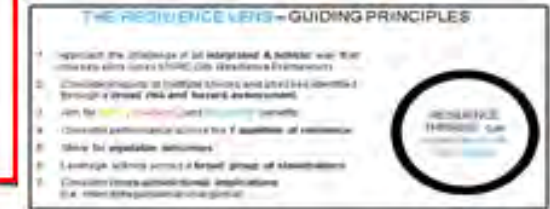
<b>Draft 1 (draft PRA)</b>	<b>Draft 2</b>	<b>Draft 3</b>
<ul style="list-style-type: none"> <li>Leadership and management - post earthquake decision making - what can we do now, with Central Government and business, to ensure as smooth as possible decision making arrangements post-earthquake? Do we need a coordinated recovery plan?</li> <li>How can the Lifelines Group and other infrastructure owners be more effective to ensure basic needs can be met, and recovery restoration times shortened? Can we work together to use information and technology better?</li> <li>How can we empower our communities to improve their disaster readiness? What can be done to achieve better rates of residences with secured piles, chimneys and hot water cylinders?</li> <li>Is a fresh approach warranted for Business Continuity Planning?</li> <li>What are the top ten most loved heritage buildings and what would it cost to mitigate earthquake damage?</li> <li>How do we use both pakeha and maori knowledge to find solutions?</li> </ul>		



# Discovery Area: Climate Change and Sea Level Rise

## Your Challenge

To refine diagnostic questions (areas of focus for investigation and initiative development for your Discovery Group), and cross cutting themes (areas of synergies and co-benefits across all Discovery Areas)



**1.** 1) Discuss and refine the following vision (5 minutes):

**Vision**

Wellington's environmental leadership role as the capital city of clean and green New Zealand is aligned with current and planned actions to mitigate and adapt to a changing climate and rising sea levels in particular.

**2.** 2) In bullet points, begin to define the challenge and tell the story. (10 minutes).

**Background**

**3.** 3) Discuss what should be group's focus for investigation and initiative development. Choose three of the current diagnostic questions with the highest resilience dividend potential? Note them down, amend if necessary. Describe the co-benefits and the dividend. Are there other questions that could lead to actions with higher dividend? (20 minutes)

**Resilience Dividend**

Which part of the city system do we need to focus on to generate the greatest resilience dividend?

During the Phase 1 we reviewed existing actions, and we asked the stakeholders where we need to focus, where is the biggest opportunity for improvement. Where are our key weaknesses and strengths.  
Red - can do much more    Yellow - can do more    Green - doing well

**4.** 4) Discuss the cross cutting themes. Choose three of the current diagnostic questions that best address the cross cutting themes. Note them down and amend as you agree. Are there other questions? (15 minutes)

**Cross Cutting Themes**

Earthquake Recovery	Climate Change and Sea Level Rise	Economic Prosperity	Quality of Life
---------------------	-----------------------------------	---------------------	-----------------

**Cross cutting theme**

- Engaged and empowered communities
- Maori knowledge and perspective
- Leadership and collaboration skills
- Sense of place: natural and urban form
- Technology and information

Cross cutting themes highlight strategies and potential equity areas that can generate synergies and co-benefits across the city system and build resilience to all types of shocks and stresses.

Other cross cutting themes?

- 5) What do we focus on? Revise diagnostic questions based on your discussions in task 3 and 4. Narrow down diagnostic questions - 2-6 questions. Record in Draft 2 (20mins)
- 6) Cross cutting group exercise - present to the group, take relevant questions to a cross cutting theme tables (40mins)
- 7) Revise your diagnostic questions incorporating feedback from cross cutting theme discussions. Draft 3 (10mins)

<b>Diagnostic questions</b>	<b>Resilience dividend</b>

**Diagnostics Questions**

<b>Draft 1 (draft PRA)</b>	<b>Draft 2</b>	<b>Draft 3</b>
<ul style="list-style-type: none"> <li>What are the regional and long term principles that we might adopt for managing the effects of sea level rise? Do we need to develop an adaptation plan?</li> <li>How might we build on our strengths of cohesive and engaged communities to engage effectively and make the decisions we need to make? How can we avoid confrontations such as those in Kapiti and Christchurch?</li> <li>What are the high level economic impacts of likely adaptation and mitigation options, measured against the cost of doing nothing?</li> <li>How do we protect and enhance Wellington's sense of place in the face of eroding coastline?</li> <li>How can our efforts to mitigate climate change and move towards a low carbon society be integrated with resilience?</li> </ul>		

## Discovery Area: Economic Prosperity

### Your Challenge

To refine diagnostic questions (areas of focus for investigation and initiative development for your Discovery Group), and cross cutting themes (areas of synergies and co-benefits across all Discovery Areas)

1.

1) Discuss and refine the following vision (5 minutes):

#### Vision

All sectors of our society are able to withstand a sustained period of economic adversity, such as a prolonged financial crisis. In particular, the CBD's vibrancy and creativity is underpinned by resilient infrastructure and communities

2.

2) In bullet points, begin to define the challenge and tell the story: (10 minutes)

#### Background

3.

3) Discuss what should be group's focus for investigation and initiative development. Choose three of the current diagnostic questions with the highest resilience dividend potential? Note them down, amend if necessary. Describe the co-benefits and the dividend. Are there other questions that could lead to actions with higher dividend? (20 minutes)

#### Resilience Dividend

Which part of the city system do we need to focus on to generate the greatest resilience dividend?



During the Phase 1 we reviewed existing actions, and we asked the stakeholders where we need to focus, where is the biggest opportunity for improvement, where are our key weaknesses and strengths.

#### Diagnostic questions

#### Resilience dividend

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4.

4) Discuss the cross cutting themes. Choose three of the current diagnostic questions that best address the cross cutting themes. Note them down and amend as you agree. Are there other questions? (15 minutes)

#### Cross Cutting Themes

Earthquake Recovery	Climate Change and Sea Level Rise	Economic Prosperity	Quality of Life
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#### Cross cutting theme

- Engaged and empowered communities
- Maori knowledge and perspective
- Leadership and collaboration skills
- Sense of place: natural and urban form
- Technology and information

Cross cutting themes highlight strategies and potential enquiry areas that can generate synergies and co-benefits across the city system and build resilience to all types of shocks and stresses.

Other cross cutting themes?

#### Diagnostic Questions

- What do we focus on? Revise diagnostic questions based on your discussions in task 3 and 4. Narrow down diagnostic questions 2-5 questions. Record in Draft 2 (20mins)
- Cross cutting group exercise - present to the group, take relevant questions to a cross cutting theme tables (40mins)
- Revise your diagnostic questions incorporating feedback from cross cutting theme discussions. Draft 3 (10mins)

#### Diagnostics Questions

##### Draft 1 (draft PRA)

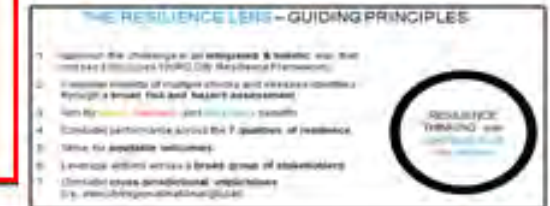
- How can our businesses, including SMEs become more active partners in building city resilience?
- How can we build on our strengths to add to Wellington's success?
- Are we building the resilience dividend into the work of the Urban Development Agency and the Wellington Regional Economic Development Agency?
- Do we understand which parts of Wellington contribute most to the economy, and might therefore need a higher resilience investment? Do we understand the economic risks of not investing in resilience?
- How can we turn our resilience challenges into economic opportunities by developing world-class technology?
- How can we build a sense of community in the CBD?
- How do we protect the CBD's sense of place? Long term, due to its current vulnerabilities, do we need to think about shifting the CBD?

##### Draft 2

5.

##### Draft 3

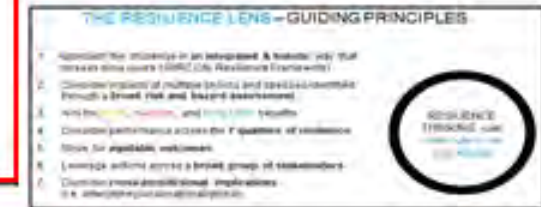
7.



## Discovery Area: Quality of Life

### Your Challenge

To refine diagnostic questions (areas of focus for investigation and initiative development for your Discovery Group), and cross cutting themes (areas of synergies and co-benefits across all Discovery Areas)



**1.**

1) Discuss and refine the following vision (5 minutes)

**Vision**

All Wellingtonians enjoy access to healthy, resilient and affordable housing, employment and nourishment.

**2.**

2) In bullet points, begin to define the challenge and tell the story (10 minutes)

**Background**

**3.**

3) Discuss what should be group's focus for investigation and initiative development. Choose three of the current diagnostic questions with the highest resilience dividend potential? Note them down, amend if necessary. Describe the co-benefits and the dividend. Are there other questions that could lead to actions with higher dividend? (20 minutes)

**Resilience Dividend**

Which part of the city system do we need to focus on to generate the greatest resilience dividend?

During the Phase I we reviewed existing actions, and we asked the stakeholders where we need to focus, where is the biggest opportunity for improvement, where are our key weaknesses and strengths.  
Red - can do much more    Yellow - can do more    Green - doing well

**4.**

4) Discuss the cross cutting themes. Choose three of the current diagnostic questions that best address the cross cutting themes. Note them down and amend as you agree. Are there other questions? (15 minutes)

Cross Cutting Themes			
Earthquake Recovery	Climate Change and Sea Level Rise	Economic Prosperity	Quality of Life
Cross cutting theme		Diagnostic Questions	
<ul style="list-style-type: none"> <li>Engaged and empowered communities</li> <li>Maori knowledge and perspective</li> <li>Leadership and collaboration skills</li> <li>Sense of place: natural and urban form</li> <li>Technology and information</li> </ul> <p>Cross cutting themes: highlight strategies and potential equity areas that can generate synergies and co-benefits across the city system and build resilience to all types of shocks and stresses.</p> <p>Other cross cutting themes?</p>			

5) What do we focus on? Revise diagnostic questions based on your discussions in task 3 and 4. Narrow down diagnostic questions - 2-5 questions. Record in Draft 2 (20mins)  
6) Cross cutting group exercise - present to the group, take relevant questions to a cross cutting theme tables (40mins)  
7) Revise your diagnostic questions incorporating feedback from cross cutting theme discussions. Draft 3 (10mins)

Diagnostic questions	Resilience dividend

Diagnostics Questions		
Draft 1 (draft PRA)	Draft 2	Draft 3
<ul style="list-style-type: none"> <li>How do we ensure that no-one gets left behind as Wellington prospers?</li> <li>How can councils, businesses and individuals collaborate to improve the quality of our housing and safeguard health of our communities? Can we partner better with others?</li> <li>If another 50,000 people come to live in Wellington, what does that mean for the housing market and everyone's quality of life?</li> <li>Can we map housing areas with natural hazards and social and economic statistics? How can we use this information technology to drive better resilience?</li> <li>What other measures can we take to ensure that all Wellingtonians share in Wellington's prosperity?</li> </ul>		