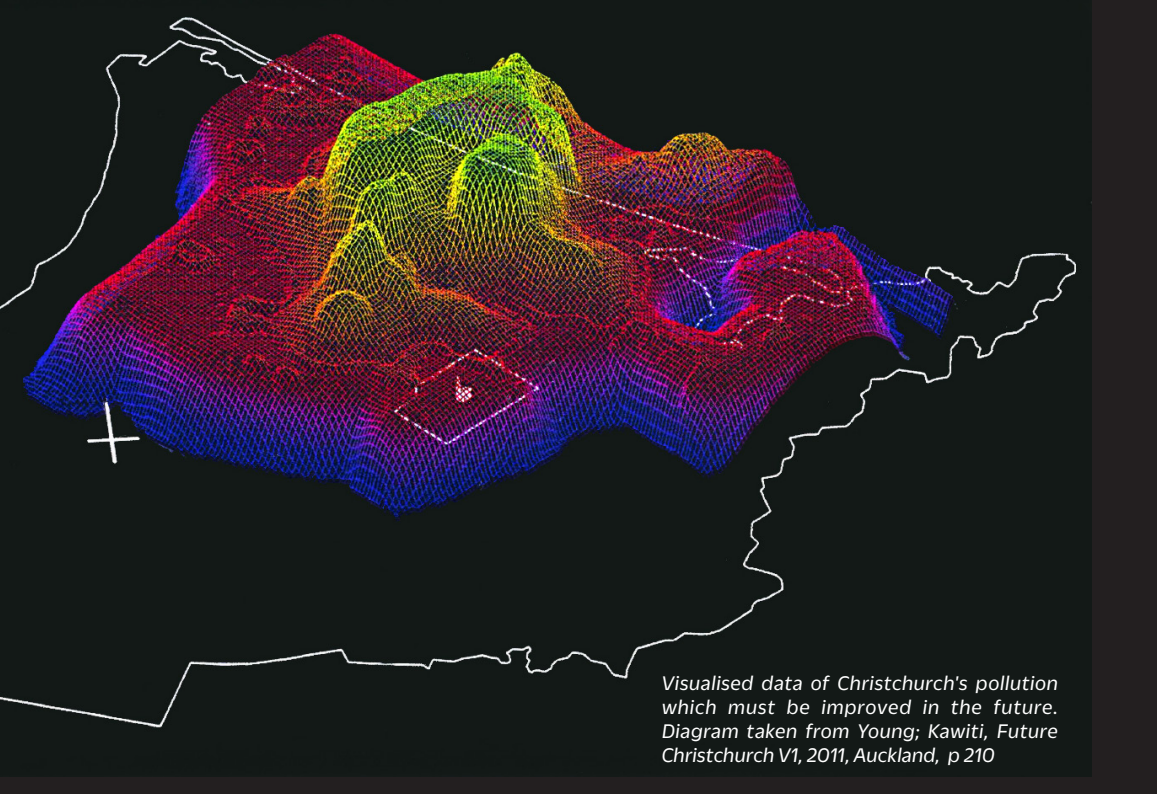
# CLIMATE-RESILIENT CHRISTCHURCH

Urbia Group
Think Beyond

# THE POTENTIAL

The earthquakes that destroyed Christchurch in 2010 and 2011 caused hundreds of fatalities, personality tragedies, and widespread devastation. However it also created the opportunity to reshape Christchurch into a city for the 21st century. Before the disasters Christchurch was considered to be the exemplary historical city of New Zealand - a bizarre concept given the age of country relative to the rest of the world. Nevertheless the Victorian city faltered because, as a town well-planned in the 19th century, it became increasingly unfit for the demands of the 21st. Rather than repeating the vision of our predecessors, the earthquakes have created the potential for a future Christchurch to be developed, with new challenges to be mastered.

*Let's think boldly: Respectful preservation of heritage demands authenticity. Thus we imagine Christchurch's former cathedral and the core city to remain as monument of former glory, honest about that life has moved on.*



*Visualised data of Christchurch's pollution which must be improved in the future. Diagram taken from Young; Kawiti, Future Christchurch V1, 2011, Auckland, p 210*

# NEW CHALLENGES

Although the earthquakes are the most topical challenge facing Christchurch, there are many others to be considered. In December 2013 the Secretary General of the United Nations Ban Ki-Moon stated in his address to the Arctic Circle in Reykjavik, "Climate Change is the single greatest long-term threat to our survival." The vast majority of New Zealanders now live in urban environments and as cities are long-term manifestations of our lifestyle, economy, and culture, we must begin to tackle Climate Change in our cities first.

Many aspects of Christchurch can be improved in the re-build that will simultaneously mitigate Climate Change - the greatest of which would be the reduction of private transport. By creating a walkable, bike-friendly city, where public transport give citizens easy alternatives, we can stop the trend of an ever-increasing fleet of motor vehicles (the largest net contributor to climate change pollution[1]). In the 15 years prior to the earthquakes, Christchurch's number of private vehicle usage soared by 39%, resulting in a total of 60% of all commuters compared with 6% pedestrians, 7% cyclists, and 5% using public transport (Young; Kawiti, 2011). The new Christchurch must be designed from the outset to reduce greenhouse gas emissions.

[1] *Zachary Shahan, NASA Says: Automobiles Largest Net Climate Change Culprit, 23 February 2010 http://cleantechnica.com/2010/02/23/nasa-says-automobiles-largest-climate-change-culprit/, retrieved 15 October 2014*

### Future Coastal Protection

Soft-engineering provides solutions that are adaptive and responsive, rather than protecting to a fixed, assumed level. This allows the solutions to be more future proof.

### Ecological Remediation

Engineering that aligns with nature provides the opportunity for native plant growth and increases ecologies through the provision of food sources and habitats.

### Water Purification

The surrounding bodies of water will be purified using natural methods. Oysters feed off pollutants in the water, processing approximately 60 gallons per day. Planting around the coastline absorb pollutants prior to surface run off water reaching the ocean.

### Urban Reinvigoration

Removing hard barriers allows cities to become more amphibious and stimulating. It provides connectivity with the water, generates place making opportunities and encourages maritime lifestyles.

### Economy

Solutions that minimize hard engineering not only have lower capital costs, but are cheaper long term as they require less maintenance. Savings are increased through the reduced demand on infrastructure.

### Emission Reduction

The introduction of planting and other natural approaches leads to an increase in the conversion of carbon dioxide into oxygen. Additionally they replace materials such as concrete and asphalt which are significantly more carbon intensive.

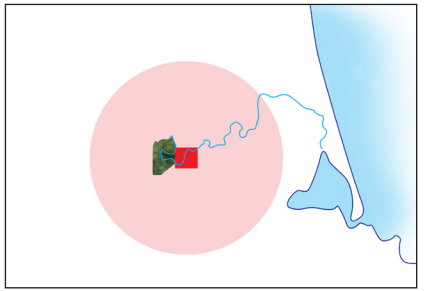
# NEW TOOLS

Another aspect to mitigate Climate Change is through smart urban design. Flow-on effects of Climate Change including rising seas and the erosion of cliffs, dunes and beaches which put low-lying coastal communities under threat. In addition, more intense weather patterns are predicted to bring heavier and more frequent rainfalls and storms.

Christchurch has a vast area of low-lying land which is vulnerable to the dangers of sea-level rise and coastal erosion. This area has grown substantially as a result of the subsidence caused by the earthquake's liquefaction and is up to 50cm in some areas including estuaries and river banks. Additional parts of the city are also under risk of liquefaction in the future, which makes a simple rebuild like-for-like impossible.

Despite the somewhat dire situation facing Christchurch, it has been selected by the Rockefeller Foundation as one of 100 resilient cities assisted to face the challenges of the 21st century, as they believe that Kiwi ingenuity will not only rebuild the city but transform it into a world-leading model of urban resilience and improved liveability.

# APPROPRIATION TO ADAPTATION

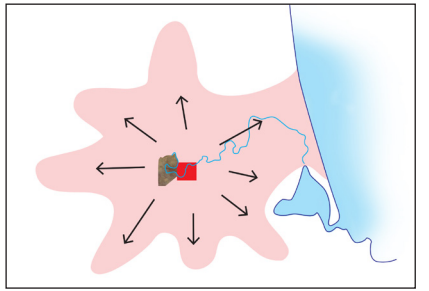


### The Original Christchurch

In the historical development of Christchurch there are two tipping points. One was around 1950, when the city began to outgrow its classical footprint, up to which size the core-city could serve its suburbs and transportation could be facilitated without individual cars. Prior to the 1950s the city centre provided all major retail, administration, and cultural facilities. The tram could easily get people there and the surrounding green was close by.

### The Expanding Christchurch

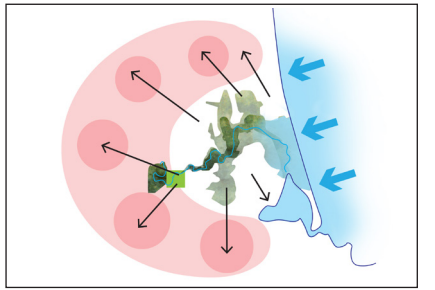
In the latter half of the last century the suburbs extended so far that they turned into full-blown sub-centres with their own shopping malls and commercial work offerings. This growth was fuelled by the growth of the private vehicle ownership, that was also needed to reach areas of recreation, which had become further away. The effect of this suburbanisation was traffic congestion, pollution, and a declining city centre, as people preferred the malls close to where they lived.



The earthquakes and the aim for climate resilience, however, provide the opportunity to turn this around. In the years following the disaster both people and commerce moved to the suburbs, particularly in the west. While the suburban shopping malls flourished, the remaining city outside the red zone came under threat and is barely surviving. Town-planning still favours a dense rebuild of the core contrary to life already relocating outwards. Consequently there could emerge a strange assembly of well-designed big-box commercialised public venues, like the stadium and the convention centre, situated largely over urban wasteland.

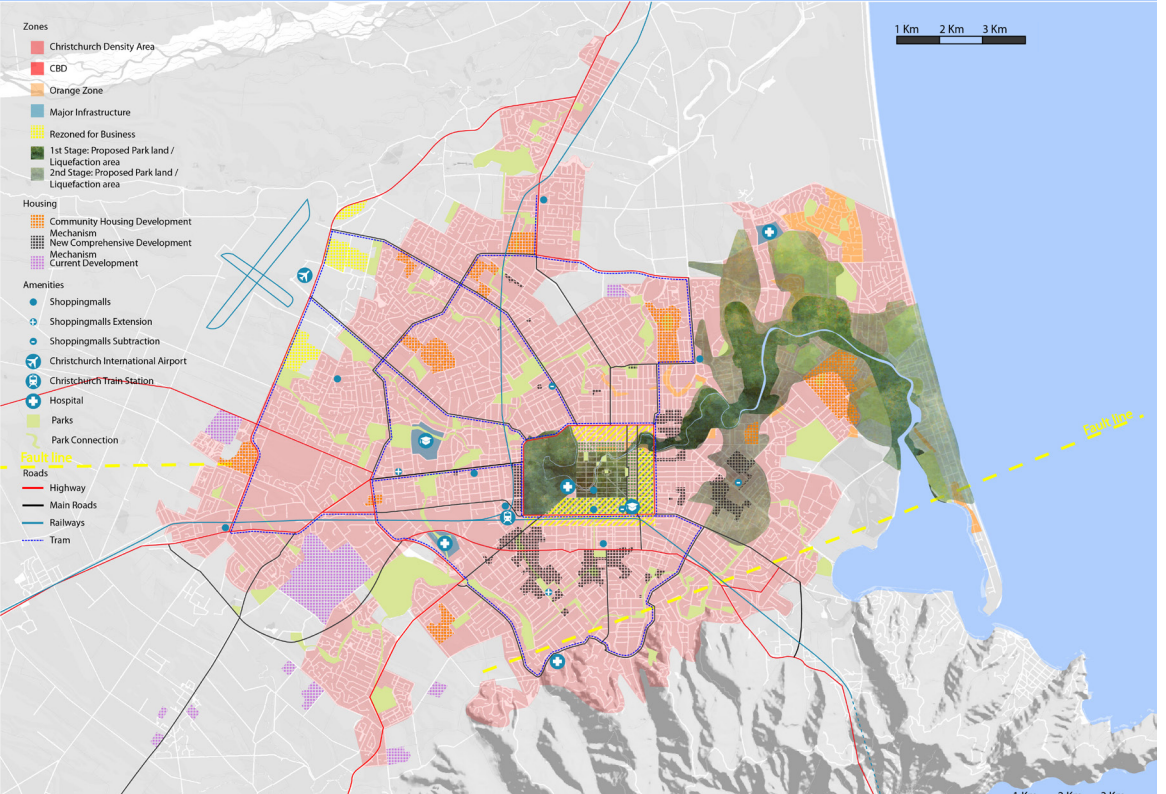
*Bringing the great outdoors into the city limits invites Cantabrians to live healthier together. Cycling and walking replace driving which helps both us and the environment.*

# LIQUIFACTION AS POTENTIAL



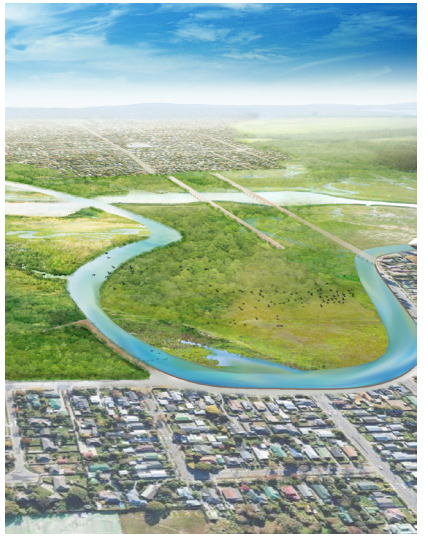
It's time to consider an alternative that is complementary to our lifestyles in the 21st century, where many tasks can be carried out online such as shopping and working, and where Climate Change suggests significant changes in the tradition of urban planning.

Years with a red zoned centre prove that we don't need city-centres any more for economic prosperity, although we might need them to tie our identity to it. Convention centres belong by motorways at the fringes, where access is convenient. There should be green open spaces close by where people live, penetrated by bike-paths and hiking trails.




# THE GREEN PRINT

Thus our alternative plan to the official Blue Print is based on observing the shift of life from the city and into the suburbs of Christchurch, fully taking over all city functions. A crescent of micro-urbs (former suburbs) embrace the green heart, the centrepiece for Christchurch that extends from the shore to the core connecting Hagley Park with the Pacific. All current and potential future areas of liquefaction as well as those of subsidence are reverse-engineered into coastal grass and marshland. Closer to the sea the ecology morphs into wetlands, which are the best and cost-efficient buffers to storm-surge.



# CLIMATE RESILIENT LIVEABILITY

Instead of an ocean of houses, where everyone is separated and individualised, the green heart invites the surrounding neighbourhoods to enjoy together. From former disasters we know that socially connected neighbours recover much better than isolated ones.

This plan entails the advantages of traditional parks, but on a larger scale that is easily reached by pedestrians and cyclists from all directions. Within the vast greenland will be berms that take care of rising sea-levels by integrating the landscape instead of unattractive and unfit stop-banks.

Connecting resilience to natural disasters with social cohesion, increased biodiversity and liveability are features that take advantage of Christchurch's tragedy. Big catastrophes need to be countered by big creativity. When an entire city is damaged, the whole urban environment needs to share the efforts of a rebuild as well as the benefits of it. Christchurch's rebuild is a defining opportunity for New Zealand to create an alternative to current planning methods, and challenge status quo. By raising awareness of this, we can envisage what can lie ahead for the future Christchurch.

# URBIA GROUP

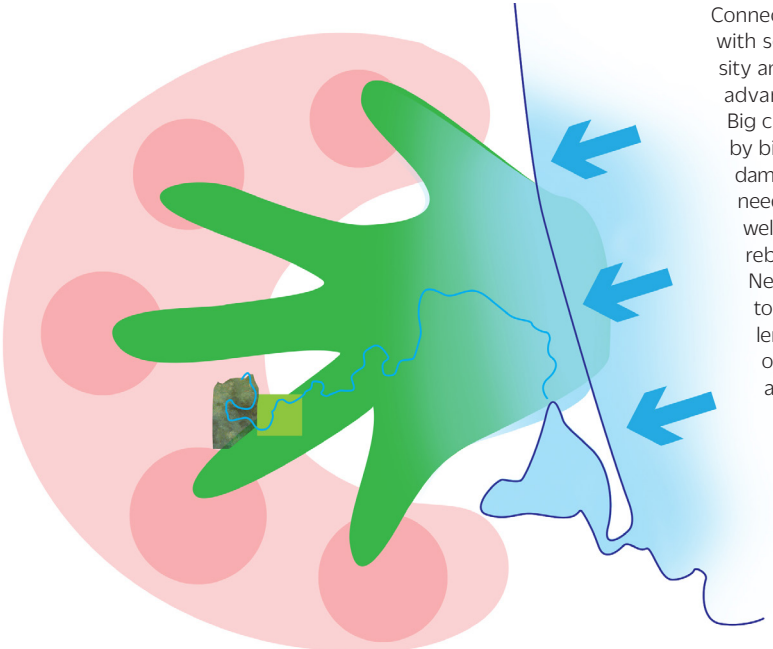
**Urbia Group** transforms the challenges of Climate Change into opportunities, developing alternatives that encompass the complexity of urban societies. We **think beyond** the current paradigm and creating vibrant, natural places filled with culture and community.  Our vision brings together a range of experts united by a common goal; to envisage cities where people love to live.

**Bernd Gundermann**, founder of Urbia Group, is at the forefront of global thinking in the area of coastal response options to climate change. He believes that to meet the challenge of climate change, mankind needs to change our mindset of operating in isolated disciplines and bring together our thinking into a comprehensive and holistic approach.

His research on coastal design to protect against the effects of Climate Change has just been published in a text book in India, and will be adopted into the curriculum for smart planning in many universities throughout the country. He has produced two booklets on Sea-Level Rise and Coastal Responses; Adaptive Urbanism and From Resistance to Resilience, demonstrating his philosophy of aligning urban interventions with the natural environment.

Before becoming an architect, Bernd studied geosciences and was actively engaged in the preservation of coastal estuaries. Since then he has had more than 30 years experience as an architect and urban designer. Bernd was Lead Master Planner and Architect for the Hanseatic Trade Centre in Hamburg, converting 15 hectares of former port into a mixed use development, which led to the largest port-conversion project in Europe; Hamburg's Harbour City.

Bernd converts a seemingly overwhelming problem into an opportunity to reinvent cities into vibrant, communal, natural environments.



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For more information, please visit our website:

**www.urbiagroup.com**

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