



15 August 2017

Committee Secretary  
Senate Standing Committees on Environment and  
Communications  
PO Box 6100  
Parliament House  
Canberra ACT 2600

**Ask for:** Bill Millard  
**Phone:**  
**Our Ref:** A2655632

Dear Committee Secretary,

**Senate Inquiry into current and future impacts of climate change on housing, buildings and infrastructure**

Hobsons Bay City Council welcomes the opportunity to contribute to the Senate Inquiry into current and future impacts of climate change on housing, building and infrastructure. Council has a strong commitment to action on climate change through mitigation and adaptation measures outlined in our Corporate Greenhouse Strategy 2013-20, Community Greenhouse Strategy 2013-30, Climate Change Policy 2013 and Climate Change Adaptation Plan 2013-18.

Climate change is projected to have a significant impact on local communities and their wellbeing. How effectively we plan and manage our built environment will have a significant impact on the resilience of our communities. Strong and consistent collaboration and action between all three tiers of government is needed to ensure the best outcomes for our communities.

The attachment provides feedback on the impacts and key governance issues of climate change on housing, building and infrastructure and responds to all 14 categories of the terms of reference.

If you would like to discuss this submission further, please contact Bill Millard, Director Strategic Development on

Yours sincerely,

Chris Eddy  
**Chief Executive Officer**



## **Hobsons Bay City Council's submission to the Senate Inquiry into current and future impacts of climate change on housing, building and infrastructure**

### Introduction

The City of Hobsons Bay is situated on Port Phillip Bay, approximately 20 kilometres south west of Melbourne's central business district. The community has told Council that they value Hobsons Bay for its foreshore, beaches, waterways and natural spaces. Consultation through the development of the Hobsons Bay 2030 Community Vision shows that the community want to see strong action on climate change and its impacts ([www.hobsonsbay.vic.gov.au/Community/Hobsons-Bay-2030-community-vision](http://www.hobsonsbay.vic.gov.au/Community/Hobsons-Bay-2030-community-vision)).

Hobsons Bay is particularly vulnerable to the adverse effects of climate change. These include higher average temperatures, reduced rainfall and extreme weather events. With over 23 kilometres of foreshore, storm surges and sea level rise are real threats to our municipality. Immediate action is necessary to build our capacity to respond to the challenges of climate change and to enable a more effective response that minimises the environmental, economic and social impacts. It is also important for Council to lead our community to adapt to the adverse effects of climate change.

The following is feedback on the impacts and key governance issues of climate change on housing, building and infrastructure and responses to all 14 categories of the terms of reference.

### Key considerations for all categories

There is strong community support for action on climate change, both in terms of mitigation and adaptation. To effectively manage climate change, we require:

- research on climate change, climate change impacts on the built environment and the effectiveness of responses needs to be undertaken and disseminated effectively so that decisions can be made using the best available scientific information
- collaboration is needed between all levels of government, its agencies and departments
- significant knowledge sharing and capacity building throughout all sectors to plan for and manage climate risk
- clear and consistent messaging around what action is being taken and why it is needed
- both integrated planning and scenario planning are needed to inform decision making in an increasingly complex environment



It is noted that during droughts, significant community education is undertaken to assist individuals to understand why behaviour change in the use of water is required. Community education is fundamental in assuring the public that everyone (residents, businesses and governments) are responsible for sustainable water usage. In these cases, a clear, consistent, fair and equitable approach, where the societal benefits are clearly articulated, has been shown to result in strong community support for quite strict and sudden changes in the regulatory environment.

To achieve action on climate change, all three tiers of government need to work together, collaboratively and consistently, in the best interests of the public. A collaborative and consistent approach is required to form clear messaging and educate the community.

**a. recent and projected changes in sea level rises, and storm surge intensity**

Currently there is a significant gap in information available for coastal planning and sea level rise. The national first pass assessment of sea level rise is at a high resolution with limited usefulness for land use planning. Effective mapping that shows likely sea level rises over a range of time periods is needed at a scale that can inform land use decisions. It is most effective to undertake this mapping at a federal or state level due to the scale of the problem and to ensure a consistent approach between regional agencies and include local councils.

Mapping should be refreshed at regular intervals (e.g. every decade) and incorporate the latest scientific information. Mapping should clearly communicate the probability of the risk occurring in a way that is clear to the community. For example: 'based on the best available science at the time there is a 10 per cent chance that sea level rise will be less than this and a 90 per cent chance it will be greater than this.' Such an approach will enable the community to understand the risk and will limit the temptation for modeling to be based on lower level risks due to political pressure.

Coastal communities are impacted by the interactions between land based and coastal flooding. In many cases agencies that manage coastal processes are separate to agencies that manage land based flooding processes. This can lead to a significant gap in flood modeling and understanding of risks to coastal communities. It is vital that these agencies collaborate to ensure gaps are removed.

It is noted that the CSIRO developed a tool to explore the complex interactions between coastal and land based flooding and different control measures. This project was undertaken in conjunction with the City of Port Philip. Continued funding of projects such as this, along with implementation of outcomes, is a priority to coastal communities.



## **b. recent and projected changes in temperature and precipitation**

### Temperature

The reduction of overnight low temperatures and increasing daily high temperatures, brought about by climate change, are already having a significant impact on heat stress and associated health risks. This has significant impact on public health and community safety as both work place injuries and levels of violence are evidenced to increase during periods of extreme heat. This in turn has a significant impact on emergency services and first responders from police and ambulance services through to hospitals and social services.

The urban heat island (UHI) has been shown to increase the effect and associated risks of extreme heat. Houses, buildings, roads, streetscapes and the infrastructure that makes up our built environment can be designed in a way that reduces the UHI effect. There is currently no legislation, standards or guidelines that provide a minimum standard for managing this issue. There is also a knowledge deficit, through lack of training or capacity building, to enable the design and construction sector to increase their capacity to reduce the UHI effect.

The use of light coloured materials including roofing materials and road surfacing materials, is a practical solution to reducing the UHI effect. The UHI can also be managed through the use of blue-green infrastructure. Green infrastructure includes trees, gardens, creepers and vegetated walls and roofs throughout urban areas. For example refrigerated warehouses may benefit from green roofs to provide insulation and mitigate the UHI effect, reducing energy costs and reducing the risk of heat stress to workers. Blue infrastructure includes using rainwater, stormwater, recycled water and other water sources to maintain the green infrastructure. Integrated water management is discussed further in section f. These techniques to reduce the UHI effect are applicable to all projects, from large scale (e.g. major roads) to small scale (e.g. individual dwellings). These techniques need to become business as usual to reduce the risk of heat stress and associated health issues.

### Precipitation

The change in precipitation will bring a number of risks including flooding and water security.

The recent work to upgrade the Australian Rainfall and Runoff Guidelines, which guides how flood modeling is undertaken, is an important first step in improving the capacity of the water industry to manage flood risks. Further work is needed to strengthen the process for considering climate impacts in flood modeling and make it business as usual.



Organisations such as the Cooperative Research Centre (CRC) for Water Sensitive Cities have developed data sets that will enable the modeling of future climate scenarios in software, such as MUSIC (Model for Urban Stormwater Improvement Conceptualisation). This will enable government organisations such as councils to consider climate change impacts on the design of their stormwater harvesting facilities, enabling future-proofing of stormwater harvesting systems from climate impacts.

Ongoing funding for research and projects such as these is critical to enable effective planning and management of changing flood risks and climate impacts.

Integrated water management is discussed further in section f.

**c. recent and projected changes in extreme weather, including heatwaves, bushfires, floods, and cyclones**

Changes in the frequency and intensity of extreme weather will have a significant impact on emergency management services. Emergency management planning is traditionally based on historical records of risk to determine the likelihood of different magnitudes of risk. Planning based on historical events no longer meets the current needs of emergency managers due to the increased intensity and frequency of extreme events with climate change. Heatwaves are an example where increased frequency and intensity has already been seen.

The way we design and construct our houses, buildings and infrastructure also has a significant impact on the risk to human life and wellbeing and the magnitude of the emergency response required.

To effectively plan for and manage extreme weather events, climate projections are needed that are based on the best available science and are relevant to the local area. This information should be widely disseminated and readily accessible to inform emergency management planning. It should also inform minimum legislative standards and planning decisions to ensure houses, buildings and infrastructure are designed and built to reduce the risk to human life and wellbeing.

**d. recent and projected changes in natural coastal defense systems including coral reefs, kelp and mangrove forests**

Hobsons Bay, like many low lying coastal areas, has a predisposition to erosion from coastal processes such as wind, tide, currents and storms. Significant erosion has already occurred and will only increase with climate change and the associated storm surges and sea level rise. Coastal areas require a range of protection strategies for a wide range of geographies and land uses. These may be natural, man-made and, most likely, a combination of both.



There is a need for considerable research, knowledge sharing and capacity building to better understand the interface between land and water, and the suitability of techniques to protect different land uses.

This research, knowledge sharing and capacity building needs to be continuous, adaptive and consider long-term scenarios and implications. In particular, long term monitoring and evaluation of different coastal protection techniques is required to determine success and understand any unintended consequences. Techniques such as mangrove trees may prove to be very successful in reducing erosion, however when applied to areas of coastal saltmarsh the mangroves may significantly change the habitat and biodiversity of an area. Only through long term monitoring and evaluation will there be the capacity for coastal managers to learn and improve their techniques for coastal protection. A regional approach is important to coastal management.

All levels of government, and their departments, need to work together to fund this research and the associated works to protect local communities and the coastal environment.

**e. the impact of these changes on the vulnerability of infrastructure in coastal areas**

Coastal assets are already being impacted by climatic conditions with councils having to replace or relocate infrastructure such as coastal trails due to damage from storm surges. The cost to protect, upgrade and repair coastal assets is expected to increase with climate change and sea level rise.

As identified in section d, research, knowledge sharing, capacity building and particularly monitoring and evaluation, are needed to understand the effectiveness and impacts of protection and adaptation measures.

**f. the impact of these changes on water supply and sewage treatment systems**

Water is critical to human survival. It also plays a key part in the livability of our built environment. Climate change is projected to reduce net rainfall, reducing stream flows and the water available for both crop irrigation and drinking water supplies. Sea level rise and extreme heat will impact on the reliability of sewerage infrastructure that protects human health from water borne pathogens. As such it is critical that all decisions around water supply and sewerage treatment systems are based on the best available scientific information about the future climate conditions these systems will be operating within. Research is needed to ensure that locally relevant climate projections are available to inform decision making.

Increasingly, Australian cities and towns are transitioning to an integrated water management approach in order to address the following:



- increase water security through efficiency and the creation of alternative water supplies
- have water available, and utilise it where it falls, for the maintenance of green infrastructure. Green infrastructure is needed for urban cooling and the wellbeing of the general public. For example from Council's 2013 open space survey, 63 per cent of the community said that their main reason for accessing parks and coastal areas is to relax and unwind
- to mitigate flood risk
- to improve the health of waterways, bays and coastal areas through improved water quality for public health and biodiversity protection

As such an integrated water management approach can play a key role in managing a number of climate risks. The success of the transition, to date, towards integrated water management or water sensitive cities has been based on the following:

- strong and ongoing research funding with a strong focus on industry partnerships and knowledge sharing between researchers and the industry such as the approach currently taken with the CRC for Water Sensitive Cities
- ongoing capacity building and financial support from a number of agencies in Victoria such as Melbourne Water and Clearwater
- building community understanding and awareness

A key barrier is the complex building and planning regulatory environment that often enables individual dwellings to be built prior to long term planning around water infrastructure taking place.

All levels of government have a role to play in both land use planning (including the building regulations) and water system planning. It is therefore essential for all levels of government to take a proactive, continuous and collaborative approach to continue and strengthen Australia's transition to a water sensitive country.

#### **g. the impact of these changes on transportation, including railways, roads and airports**

Many of the weather events that are projected to become more extreme with climate change already have significant impact on transport services and infrastructure. For example, flooding can restrict road access from homes and businesses. While flooding overlays are registered on property titles there is nothing on property titles that tells the owner whether the public access to the property is subject to inundation. This can result in property owners, residents and business owners being unprepared to manage the risk of loss of access due to flooding.



Bus access may also be restricted due to flooding of roads. Neighbouring streets may not be suitable for buses to bypass an area of flooding. Flooded pedestrian underpasses can render a train station inoperable. Heat waves can expand and bend railway lines shutting down whole networks. Train, tram and bus users can become trapped at platforms and bus stops, exposed to the elements, with limited shelter and a lack of water. A lack of water and drinking fountains around public transport infrastructure during extreme heat increases the risk of dehydration and heat stress.

Transport infrastructure needs to be designed with both the end user and their exposure to climate risk in mind, at all times during travel. To reduce risks such as this, research into techniques such as light coloured ballast around train lines to reduce heat exposure should be undertaken. A coordinated and considered approach is needed to manage the exposure of transport systems to climate change.

**h. the impact of these changes on energy infrastructure, including generators and transmission and distribution lines**

It is noted that the risks of energy interruption are higher for electricity, as it is transferred using both above ground through poles and wires and in-ground methods along with various generators. The transmission of gas is more resilient to climate change through the use of on and in-ground pipework.

With the electricity network in Victoria being centralised, this means the impacts of failure from extreme weather events is likely to be widespread. Increasing temperatures pose an increased risk of failure of the electricity network and its capacity to supply buildings. In Victoria, heatwaves of three or more days of unusually high temperatures, pose the biggest impact on the grid, typically during every January and February. Not only is the grid put under stress by heavy loads, created by the increase in use of air-conditioning units, but high temperatures and associated heavy loads can impair the operation of key infrastructure like generators and transmission lines. Heavy loads can cause two types of blackouts to occur during a heatwave; these can be localised blackouts (a network fault) or involuntary load shedding (such as rolling blackouts, determined by the market operator).

Electricity use in Victoria has been declining through both the increase in energy efficiency and the increase in distributed energy generation, mainly from the installation of domestic solar power systems. Given the forecast population growth and increase in temperatures, there is a high potential for electricity demand to increase, which will add to the pressures on the grid. To reduce the risk to the electricity grid and therefore supply during heatwaves, a distributed energy system, utilising renewable energy and energy storage, should be prioritised.





**i. the impact of these changes on health, education and social services infrastructure, including hospitals, schools and aged care**

Education and schools

Children are particularly vulnerable to extreme heat. There are no design standards to ensure that schools, childcare centres and other related facilities protect them from extreme heat. Many school buildings were designed and built with no or minimum insulation, poor airtightness and inefficient heating and cooling systems. School playgrounds are not typically designed to protect children from a range of elements including extreme heat. Both outside and inside areas of facilities that are used for children need to be designed with climate impacts, specifically extreme heat, in mind.

Schools often finish at around 3pm, which, in summer, is often the hottest part of the day. Many students use active transport, such as walking and cycling, to get home. An increase in temperatures may increase the risk of heat stress. In addition to this, transport congestion during term time may increase due to extreme weather events. Similarly, students who catch the train home can also find their mode of transport impacted by extreme weather. Schools and students need the capacity to plan for and manage the risk posed to students by a range of extreme weather events during this commute.

Health

Climate change is projected to have many impacts on health and wellbeing including, but not limited to the following:

- risk of death or injury due to extreme weather events, particularly for vulnerable community members such as children and the elderly
- post-traumatic stress disorder and other stress related and mental health issues as a result of the following:
  - loss of a loved one during a natural disaster (e.g. a bushfire)
  - personal injury as a result of extreme weather
  - loss of property due to extreme weather or permanent change in climatic conditions such as sea level rise
  - loss of income due to extreme weather or permanent change in climatic conditions such as sea level rise
- increased incidence of vector-borne infectious diseases
- increased risk of events such as thunder storm asthma



- malnutrition as a result of food insecurity from either a loss of production due to climate change or as a direct result of infrastructure damage, disrupting the supply chain e.g. damage to ports, rail, road due, storage warehouses etc. from extreme weather
- rising utility costs and food prices which disproportionately impact the economically vulnerable and disadvantaged communities

Climate change can also have more subtle and immediate impacts on health due to unfavorable weather and unusable outdoor recreational spaces due to drought. This can result in reduced physical activity and socialisation.

#### Aged care

In the 2014 heatwave and in the days immediately following it, Council observed a spike of 250 per cent in the number of aged care clients who were admitted to hospital. As such the feedback provided in section b in relation to temperature and the need for buildings that minimise the UHI effect is considered to be relevant to this demographic.

#### Maternal and Child Health

Maternal and Child Health (MCH) nurses are already educating new parents about the risk of heat stress to their child. MCH nurses are already rescheduling checkups and immunisation appointments for parents who do not wish to take their infants out and expose them to extreme weather. Council's maternal and child health nurses observe that low income families are particularly impacted as they are less likely to have an air conditioned car to safely transport their child to and from appointments during heat waves.

Services providers need to be adaptive to client needs. Service providers already have to adapt to climate events regardless of whether this is through a formal adaptation plan or not. The Victorian Centre for Climate Change Adaptation Research undertook initial investigations into how similar services could be effectively delivered despite climate change pressures. Further research and sharing of this research is needed.

### **j. the impact of these changes on private and public housing**

#### Building and planning regulations

Housing stock and the built environment have a significant impact on both health and wellbeing. All habitable buildings need to be designed with all users in mind and must be suitable for use in both current and future climatic conditions.



Council is of the planning authority for the Hobsons Bay Planning Scheme and the National Construction Code (NCC), through statutory planning applications. However as the planning authority, Council has limited authority to influence planning outcomes in ways that protects local residents from climate impacts such as extreme heat and sea level rise. This is due to the planning provisions being set by the State Government and the NCC is set by the Federal Government.

The protection of people from climate impacts through a well-designed built environment needs to be clearly embedded within these documents. These documents need to clearly set a minimum standard for protection. State planning policy needs to be supported by a suite of appropriate planning tools to facilitate councils to respond to climate change impacts at the local level.

Not all developments trigger the need for a planning permit in Victoria, this creates an issue where there is a variation between planning scheme provisions and the NCC. Consideration needs to be given to the most effective method of ensuring that new information on the impacts of climate change, such as new sea level rise maps, are quickly and efficiently incorporated into both the state and federal regulations simultaneously.

It is noted that in 2014, the Australian Building Codes Board, who are responsible for the NCC, published the paper Resilience of Buildings to Extreme Weather Events This paper notes that while the NCC includes design measures for buildings to withstand a range of climate related hazards including cyclones, bushfires, snow and floods, it does not cover hail, storm tide or heat stress. The risk of hail, storm tide and particularly heat stress are likely to increase with climate change, and these events can have a detrimental impact on human health and infrastructure. As such, there is strong support for including design measures to manage these risks within the NCC.

Further feedback is also provided in sections i and g.

#### Vulnerable populations

Council supports community members who may be particularly vulnerable to the impacts of climate change. These typically include low socioeconomic households, the elderly, infants, children and new migrants. New migrants in particular may need support learning to adapt to Australian climatic conditions including: learning that Australian tap water is safe to drink and is better than a soft drink in a heatwave, learning that we have many droughts and how to use water wisely and learning about their rights as tenants. Dwellings that are poorly designed are at a higher risk from the impacts of climate change. This poses many issues for all residents, however vulnerable populations within our community are particularly at risk.



Poorly designed dwellings are expensive to adapt to extreme weather conditions, this is a particular concern for residents in low socioeconomic circumstances. These residents often struggle to afford the current heating and cooling costs of today's climate. This affects their willingness to use these systems, leaving them vulnerable to the health impacts of both extreme heat and cold, and will only get worse with climate change. Many sustainable design initiatives including good building orientation and good thermal performance not only protect residents from many climatic conditions but also reduce the running costs. This reduces the financial burden on residents as well as reducing greenhouse gas emissions. Current standards are very low when compared to those in other developed countries such as those in England. The current standards should be improved to protect all residents.

Public housing infrastructure is ageing, and significant investment is required to protect its residents from the impacts of climate change. A collaborative approach between government agencies and housing providers is required to address this area now and into the future.

When making decisions on how we plan and build our houses, buildings and infrastructure consideration should be given to how the built environment impacts all aspects of our health. This is particularly important to ensure climate change adaptation is possible for our most vulnerable communities who are not allowed to or cannot afford to improve the resistance to the impacts of climate change of their dwellings. Further knowledge sharing and capacity building is needed to enable decisions around the built environment to adequately address health outcomes. A cross disciplinary approach is required.

#### **k. the impact of these changes on public recreation and tourism facilities**

Hobsons Bay has significant public recreational and tourism facilities located along the coastline including, but not limited to the following:

- significant biodiversity areas, coastal parks and marine parks
- bicycle and walking trails
- parks and sports grounds
- beaches

Hobsons Bay is unique in the sheer amount of biodiversity, parks and sports grounds we have in a highly urbanised area so close to the centre of an Australian capital city. For this reason, our recreational areas receive high visitation from local and regional residents.

Aerial photos show that significant loss of low lying coastal parklands is already taking place, particularly around Altona Coastal Park and the Ramsar listed Cheetham



Wetlands. Coastal communities want to see these and other coastal assets protected. In some instances, such as the protection of biodiversity and coastal parklands, the most effective method of protection is to leave room for coastal retreat particularly along waterways. This requires strong foresight, planning and regulation.

Local businesses rely on these significant assets to bring in tourists. The loss of these assets will have a significant impact on the local economy and the local community who hold these assets in high value. Significant planning and support is needed to assist coastal communities to manage the loss or relocation of these assets and to prepare their local economies.

**l. the impact on financing and insurance arrangements for housing, buildings and infrastructure**

Insurance policies are typically valid for one year at a time. By contrast housing loans can typically be for up to 30 years. Financing for home loans, businesses and their buildings and infrastructure is often dependent on insurance being available. Investors, whether they be first home buyers or large businesses, need clear and easily accessible information about climate risk in their area prior to making an investment decision.

Failure to have this information available creates a scenario where a household or business is likely to find themselves without appropriate insurance or the financial means to rebuild after an incident resulting in loss of property. This may have significant economic repercussions.

Making information available about climate risk is just the first step. Households and businesses also need support in building their capacity to design their homes and businesses in a way that manages and minimises their climate risks. This requires significant knowledge sharing and capacity building. Households and businesses also need a reliable and easily navigable process for communicating how they have reduced their exposure to climate risk to maintain their insurability. Governments and the insurance industry need to work together to assist in establishing such a process.

**m. the adequacy of current state and Commonwealth policies to assess, plan and implement adaptation plans and improved resilience of infrastructure**

Timely, evidence based policy is needed to address the many challenges posed by climate change.

Climate change governance will only be adequate once it is considered in the policies, plans and implementation plans of all government departments at all levels of government.



As all sectors are just beginning to understand the impacts and implications of climate change on their sector there is a need for all levels of government and all departments of government to work together in a collaborative and flexible manner. As understanding of climate impacts and the mechanisms to manage them increases it is likely that institutional arrangements will need to adapt to ensure that these impacts are managed effectively.

Ongoing consultation and collaboration between governments and their departments will be needed to ensure that climate planning and action is adequately resourced on an ongoing basis.

**n. any other related matters**

It is noted that failure to mitigate climate change will significantly increase each of the risks identified in this submission. It is recommended that there is dedicated funding, at all levels, to reduce Australia's greenhouse gas emissions and adapt to the impacts of climate change.