HopgoodGanim
LAWYERS

HG Planning & Environment Factsheet

The shifting sands of coastal planning – responding to climate induced sea level rise

David Nicholls | Partner
Planning & Enviroment
P: +61 7 3024 0368
E:d.nicholls@hopgoodganim.com.au

Gemma Chadwick | Senior Associate
Planning & Environment
P:+61 7 3024 0377
E:g.chadwick@hopgoodganim.com.au

Responding to climate induced sea level rise

HopgoodGanim LAWYERS

1. Introduction

1.1 Climate change due to human induced global warming and predicted consequential sea level rise has become a mainstream social and political issue over the last ten or so years. How society should respond to it, however, is a complex and politically difficult issue with the potential to dramatically affect coastal planning and development.

1.2 The United Nations and the World Meteorological Organization established the Intergovernmental Panel on Climate Change (the **IPCC**) in 1988. In 1990, the IPCC published its First Assessment Report on Climate Change.

1.3 The IPCC predicts that climate change will affect coastal processes and that increasing greenhouse gas emissions will lead to sea level rise. Increased storm activity, the increased risk of storm surge and sea level rise are all predicted to combine to accelerate long-term coastal erosion and lead to longer-term flooding of low-lying coastal properties.

1.4 However, the understanding of the science underpinning climate change is constantly evolving. The timing of its impacts are largely speculative - the effects of climate change are potentially uncertain and variable and not expected until forty, fifty or even one hundred years into the future. When the life of most planning instruments is only 10 years, the challenge for policymakers is to come up with a sensible approach, which acknowledges the present level of information, is flexible enough to adapt to changes in information and balances costs to future generations against the economic need to facilitate appropriate coastal development.

2. Outline

2.1 This paper canvasses:

(a) Where are we now? What do our current planning documents say about climate change?

(b) Where were we 3 years ago? How did the Coastal Plan 2012 deal with climate change issues?

(c) What's changed? What does the IPCC's Fifth Assessment Report, published in 2013, say about sea level rise and risk management?

(d) What are the drivers behind planning for sea level rise? What motivates public policy?

(e) Where should we be? What are the markers of a balanced approach to managing risks associated with climate change?

3. Where are we now?

3.1 Climate Change in planning is not a new issue, and its integration into planning law is not new. The concept of climate change is enshrined in the *Sustainable Planning Act 2009* (**SPA**) with section 5 of SPA providing that advancing the act's purpose includes:

> *"(c) avoiding, if practicable, or otherwise lessening, adverse environmental effects of development, including, for example—*

(i) climate change and urban congestion; and

(ii) adverse effects on human health; and

...."

3.2 SPA's purpose is to:

"...seek to achieve ecological sustainability by—

(a) managing the process by which development takes place, including ensuring the process is accountable, effective and efficient and delivers sustainable outcomes; and

(b) managing the effects of development on the environment, including managing the use of premises; and

(c) continuing the coordination and integration of planning at the local, regional and State levels."

4. At a state level, climate change is recognised in the State Planning Policy.

4.1 The State Planning Policy (**SPP**) contains two parts – Part D, which contains the State Interests and deals with Plan Making, and Part E, the Interim Development Assessment Requirements, which apply to development assessment until planning schemes are amended to incorporate the state interests.

4.2 Part D contains the following state interest for the coastal environment:

"***State interest—coastal environment***
The coastal environment is protected and enhanced, while supporting opportunities for coastal-dependent development, compatible urban form, and safe public access along the coast."

4.3 The coastal environment state interest applies to all local government areas partially or wholly located in the coastal zone. The coastal zone is identified on the underlying SPP mapping. It represents:[1]

(a) coastal waters; and

(b) land and Queensland waters landward of coastal waters and seaward of the coastal zone inner limit.

4.4 The coastal zone inner limit is an imaginary line which represents the most landward of the following points—

(a) the point that is 5km landward of the high-water mark;

(b) the point nearest the high-water mark where land reaches the height of 10m Australian Height Datum.

[1] Coastal Protection and Management Act 1995, sections 15 and 18A

4.5 The Coastal Zone is, potentially, a very broad area.

4.6 Planning schemes are to appropriately integrate the "Coastal Environment" state interest by:

> "(*1) facilitating the protection of coastal processes and coastal resources, and*
> *(2) maintaining or enhancing the scenic amenity of important natural coastal landscapes, views and vistas, and*
> *(3) facilitating consolidation of coastal settlements by:*
> *(a) concentrating future development in existing urban areas through infill and redevelopment, and*
> *(b) conserving the natural state of coastal areas outside existing urban areas, and*
> *(4) facilitating coastal-dependent development in areas adjoining the foreshore in preference to other types of development, where there is competition for available land on the coast, and*
> *(5) maintaining or enhancing opportunities for public access and use of the foreshore in a way that*
> *protects public safety and coastal resources, and*
> *(6) including the SPP code: Ship-sourced pollutants reception facilities in marinas (Appendix 2) or similar development assessment requirements*."

4.7 "Coastal Dependent Development" specifically excludes residential development. The definition in the SPP indicates Coastal Dependent Development means:

(a) development that in order to function must be located in tidal waters or be able to access tidal water,

(b) may include, but is not limited to:

(1) industrial and commercial facilities such as ports, harbours and navigation channels and facilities, aquaculture involving marine species, desalination plants, tidal generators, erosion control structures and beach nourishment;

(2) tourism facilities for marine (boating) purposes;

(3) community facilities and sporting facilities which require access to tidal water in order to function, such as surf clubs, marine rescue, rowing and sailing clubs; or

(4) co-located residential and tourist uses that are part of an integrated development proposal (e.g. mixed use development) incorporating a marina, if these uses are located land ward of the marina and appropriately protected from natural hazards; but

(c) **does not** include:

(1) residential development as the primary use;

(2) waste management facilities, such as landfills, sewerage treatment plants; or

(3) transport infrastructure, other than for access to the coast.

4.8 Already, the SPP contains themes about consolidated existing urban areas and conserving areas that are outside that existing footprint. The text supporting the "Coastal Environment" recognises a significant portion of the Queensland's population lives and works along the coast, and that

planning and land use decisions should promote "liveable communities". The text suggests decisions should consider the effective management of urban growth needs, and promote consolidation through infill and redevelopment within existing urban areas.

4.9 However, the SPP also recognises that the coastal environment is highly dynamic and may be "*impacted by coastal erosion and storm-tide inundation*" meaning "*planning and development decision-making should employ risk-management approaches that take into account the projected impacts of a variable climate*."

4.10 The reference to a "variable climate" is an obvious reference to climate change, and its projected impacts in terms of sea level rise. The SPP goes on:

> "*The economic and social costs of protecting development against natural hazards, and the financial, social and human costs associated with a natural disaster, justify access and development constraints in vulnerable coastal areas*."

4.11 The "Coastal environment" state interest does not, itself, contain the policies regarding management of coastal hazards. Those policies are found in the "Natural hazards" state interest. Policies regarding the management of biodiversity (including within the coastal zone) are addressed in the "Biodiversity" state interest.

4.12 The "Natural hazards" state interest is expressed as follows:

> "***State interest—natural hazards, risk and resilience***
> *The risks associated with natural hazards are avoided or mitigated to protect people and property and enhance the community's resilience to natural hazards*."

4.13 The focus is on managing risks through avoidance and mitigation.

4.14 The SPP indicates that planning schemes are to appropriately integrate the state interest by:

> "***For coastal hazards—erosion prone areas****:*
> *(5) maintaining erosion prone areas within a coastal management district as development-free buffer zones unless:*
> *(a) the development cannot be feasibly located elsewhere, and*
> *(b) it is coastal-dependent development, or is temporary, readily relocatable or able to be abandoned development, and*
> *(6) requiring the redevelopment of existing permanent buildings or structures in an erosion prone area to, in order of priority:*
> *(a) avoid coastal erosion risks, or*
> *(b) manage coastal erosion risks through a strategy of planned retreat, or*
> *(c) mitigate coastal erosion risks*."

4.15 For new development, the SPP calls for development free buffer zones within the coastal management district (subject to tests about feasible alternatives, and coastal dependent development). As noted above, coastal dependent development excludes development where the main purpose is to provide residential uses.

4.16 For existing development in the erosion prone area, the SPP enshrines an "Avoid, Manage, Mitigate" hierarchy.

4.17 There are a couple of key concepts – Coastal Management Districts and Erosion Prone Areas. Coastal Management Districts are areas within the coastal zone that have been declared as a

coastal management district under a regulation.[2] Similarly, Erosion Prone Areas are areas within the coastal zone that have been declared as an Erosion Prone Areas under a regulation.[3] The minister can only declare an Erosion Prone Area if satisfied the area may be subject to erosion or tidal inundation. The current mapping for Erosion Prone Areas does not include any projected sea level rise to 2100 from climate change.

4.18 Balanced against the Coastal Environment and Natural Hazards State interests is the State interest of housing supply and diversity. That state interest is expressed as follows:

> *"State interest—housing supply and diversity*
> *Diverse, accessible and well-serviced housing and land for housing is provided."*

4.19 When making or amending a planning scheme, local governments must integrate the Housing supply and diversity state interest by:

> *"(1) locating land for housing development and re-development in areas that are accessible and well connected to services, employment and infrastructure, and*
> *(2) facilitating a diverse and comprehensive range of housing options that cater for the current and projected demographic, economic and social profile of the local government area, and*
> *(3) providing for best-practice, innovative and adaptable housing design.*
> *..."*

4.20 The "Housing supply and diversity" state interest obviously supports innovative and adaptable housing design. It also recognises that residential development should be connected to infrastructure and services, and located near employment bases. All sound planning principles.

4.21 Other relevant state interests include "liveable communities", "development and construction" and "tourism", expressed as:

> "*State interest—liveable communities*
>
> *Planning delivers liveable, well-designed and serviced communities that support wellbeing and enhance quality of life*.
>
> "*State interest—development and construction*
>
> *Planning supports employment needs and economic growth by facilitating a range of residential, commercial, retail and industrial development opportunities, and by supporting a strong development and construction sector.*"
>
> "*State interest—tourism*
>
> *Tourism planning and development opportunities that are appropriate and sustainable are supported; and the social, cultural and natural values underpinning the tourism developments are protected to maximise economic growth.*"

4.22 There is obviously some tension between the various State Interests. We know people like to live on the coast. Parts of the coasts are also major centres for employment, tourism and development. The Gold Coast, for instance, has just invested huge sums into light rail. There are already provisions dealing with risk management within an erosion prone area. The question is,

[2] Coastal Protection and Management Act 1995, section 54
[3] Coastal Protection and Management Act 1995, section 70

will an extension to the erosion prone area to account for sea level rise result in a balanced planning outcome?

4.23 Turning then, to the Interim Development Assessment Requirements (**IDAR**) in Part E of the SPP. The IDAR provisions for the coastal environment apply to development applications for a material change of use, reconfiguring a lot or operational works on land in a coastal management district.

4.24 Development applications must be assessed against the following requirements:

> "*Development:*
> *(1) avoids or minimises adverse impacts on:*
> *(a) coastal processes and coastal resources, and*
> *(b) scenic amenity of important natural coastal landscapes, views and vistas, and*
> *(2) maintains or enhances general public access to, or along, the foreshore unless this is contrary to the protection of coastal resources or public safety, and*
> *(3) avoids private marine development attaching to, or extending across, non-tidal state coastal land abutting tidal waters, and*
> *(4) that is private marine development, occurs only where the development:*
> *(a) is located on private land abutting state tidal land and is used for property access purposes, and*
> *(b) occupies the minimum area reasonably required for its designed purpose, and*
> *(c) does not require the construction of coastal protection works, shoreline or riverbank hardening or dredging for marine access, and*
> *(5) of canals, dry land marinas and artificial waterways:*
> *(a) avoids adverse impacts on coastal resources, and*
> *(b) will not contribute to:*
> *i. degradation of water quality, or*
> *ii. an increase in the risk of flooding, or*
> *iii. degradation or loss of matters of state environmental significance, or*
> *iv. an adverse change to the tidal prism of the natural waterway to which the development is connected, and*
> *(6) does not involve reclamation of tidal land other than for the purposes of:*
> *(a) coastal-dependent development, public marine development or community infrastructure, where*
> *there is no feasible alternative, or*
> *(b) strategic ports, boat harbours or strategic airports and aviation facilities in accordance with a statutory land use plan, or*
> *(c) coastal protection works or work necessary to protect coastal resources or coastal processes, and*
> *(7) provides facilities for the handling and disposal of ship-sourced pollutants in accordance with the SPP code: Ship-sourced pollutants reception facilities in marinas (Appendix 2) if the development:*
> *(a) is for a marina, with six or more berths, located outside of strategic port land, core port land or a state development area, or*
> *(b) involves individual dwellings with a structure that contains six or more berths emanating from common property, such as in a body corporate arrangement.*"

4.25 The real teeth are in the IDAR for natural hazards, risk and resilience. The requirements apply to a development application for a material change of use, reconfiguring a lot or operational works on land within, amongst other things, a coastal hazard area. Coastal Hazard areas comprise areas affected by a coastal hazard, including:

(a) a storm tide inundation area;

(b) an erosion prone area; and/or

(c) any other area identified by a local government as an area affected by a coastal hazard, based on a fit for purpose coastal hazard study, and contained within that local government's planning scheme.

4.26 Erosion prone areas are discussed above. A storm tide inundation area is defined in the SPP as "*a medium or high storm tide inundation area shown on the SPP interactive mapping system.*"

4.27 The requirements for development within an erosion prone area are:

> "*Development:*
> *(6) is not located in an erosion prone area within a coastal management district unless:*
> *(a) it cannot feasibly be located elsewhere, and*
> *(b) is coastal-dependent development, or temporary, readily relocatable or able-to-be-abandoned development, and*
> *(7) that is the redevelopment of existing permanent buildings or structures, is located outside an erosion-prone area or, where this is not feasible, redevelopment:*
> *(a) is located:*
> *i. as far landward from the seaward property boundary as possible, or*
> *ii. landward of the seaward alignment of the neighbouring buildings, and*
> *(b) provides space seaward of the development within the premises to allow for the future construction of erosion control structures, such as a seawall, and*
> *(8) proposes to undertake coastal protection work (excluding beach nourishment) only as a last resort where coastal erosion presents an imminent threat to public safety or existing buildings and structures, and all of the following apply:*
> *(a) the property cannot reasonably be relocated or abandoned, and*
> *(b) any coastal protection works to protect private property is located as far landward as practicable and on the lot containing the property to the maximum extent reasonable, and*
> *(c) the coastal protection work mitigates any increase in coastal hazard risk for adjacent areas.*"

4.28 At a state level, there are already provisions in place dealing with risks associated with climate change, such as storm tide inundation and increased erosion. The question is, what are the social, environmental and economic impacts of planning for a 0.8m sea level rise?

5. Where were we 3 years ago?

5.1 The Queensland Coastal Plan was floated in 2009 and briefly took effect in 2012.

5.2 The Coastal Plan was in two parts – a State Policy for Coastal Management that applied to development not regulated under SPA (for instance, development in State Development Areas) and a State Planning Policy for Coastal Protection, which affected planning and assessment decisions made under the SPA.

5.3 The Queensland Coastal Plan dealt with "coastal hazards" comprising:

(a) Coastal erosion;

(b) Storm tide inundation; and

(c) Permanent inundation from sea-level rise.

5.4 The mapping underlying the Queensland Coastal Plan relied upon a sea-level rise figure of 0.8m by the year 2100, based on the IPCC's Fourth Assessment Report. Notably, the Queensland Coastal Plan indicated that the figure would be updated with the release of the IPCC's Fifth Assessment report which was expected in 2014.

5.5 The policy of the Queensland Coastal Plan was to restrict the development footprint in the coastal zone by limiting development to infill and redevelopment of existing urban areas, and allowing only coastal-dependent development in other areas. Bearing in mind that the coastal zone can extend more than 5km inland from the coast (where the level of the land is below 10 m AHD) that was a very broad and significant restriction.

5.6 The restriction was amplified where land would be inundated by climate induced sea level rise of 0.8 m by 2100. In that case, the Queensland Coastal Plan imposed an absolute preclusion in respect of residential development unless an adaption strategy could be satisfied.

5.7 Are we going to see a return to the position under the Queensland Coastal Plan?

5.8 The Department of Environment and Heritage Protection (**DEHP**) has issued a new coastal hazards guide to help councils make "sound land-use decisions". Maps of erosion prone local areas have been restored to DEHP's website. DEHP has stated that:

> "*The new erosion prone area reintroduces climate change factors (including a sea level rise factor of 0.8 metres) and updates the shoreline position. It is very similar to the erosion prone area rescinded in 2014*,"

5.9 The coastal hazard maps show areas "*at risk from sea erosion or permanent inundation from tidal water and areas of temporary inundation resulting from a defined storm tide event*". They included the erosion prone areas and storm tide inundation area maps.

5.10 The Queensland Government recently sought feedback on its proposal to abolish the existing, and declare a new coastal management district (**CMD**) under the *Coastal Protection and Management Act 1995* (**Coastal Act**). Submissions closed in mid September 2015.

5.11 DEHP's website indicates that the key change proposed to the CMD mapping is consideration of the recently declared erosion prone area mapping which includes projected sea level rise to 2100 from climate change. The indication is that the current CMD is maintained, with additional lots included where permanent inundation by tidal water is expected to occur from sea level rise. DEHP has stated that "*Generally only lots in proximity to tidal water (creeks, rivers or the open coast) are included. Lots which may be inundated, but occur well inland from the coast, or those lots with relatively minor areas or inundation, are not included.*"

5.12 The potential change to the Coastal Management Districts is significant for development under the *Sustainable Planning Act* 2009. The coastal management district operates as a referral trigger under SPA (namely, for building work completely or partly seaward of the coastal building line in the coastal management district, as well as for certain operational work, reconfiguration of a lot and material change of use applications for land within a CMD).

5.13 DEHP's website indicates that:

> "*The Fifth Assessment Report released in 2014 by the United Nations Intergovernmental Panel on Climate Change (IPCC) has changed how world development scenarios are described and there are differences in how sea-level rise modelling results are*

presented. However, the results are broadly consistent with that in the Forth Assessment Report indicating that the world scientific community is approaching stable future projection. A decision was made to maintain the previous 0.8m sea-level rise projection for planning purposes to maintain stability and certainty in the planning environment. See IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp."

6. What's changed?

6.1 Why has DEHP chosen to map erosion prone areas based on a 0.8m sea level rise?

6.2 Since the release of Queensland Coastal Plan in 2012, the IPCC has published its Fifth Assessment Report.

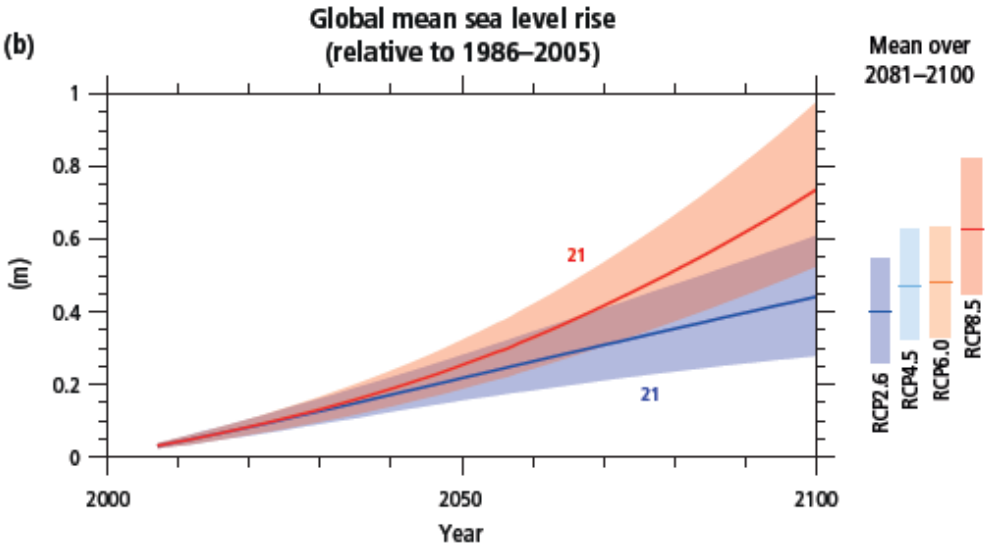
6.3 The Fifth Assessment Report models four "Representative Concentration Pathways (RCPs)" which, essentially, measure the amount of heat that is in the atmosphere. The four RCPS describe four different scenarios for green house gas emissions and atmospheric concentrations, air pollutant emissions and land use. There is a stringent mitigation scenario (RCP2.6), two intermediate scenarios (RCP4.5 and RCP6.0) and one scenario with very high GHG emissions (RCP8.5). RCP2.6 is representative of a scenario that aims to keep global warming likely below 2°C above pre-industrial temperatures.

6.4 What's new in the Fifth Assessment Report? The IPCC notes that, compared to previous assessments, the levels of risk associated with extreme events and the distribution of impacts are similar, but can be assessed with higher confidence. The indication is that prediction of temperature change has decreased slightly (as atmospheric warming has stopped for the last 17 or 18 years).

6.5 In terms of sea level rise, the IPCC's Summary Report for Policymakers states that:

> "*There has been significant improvement in understanding and projection of sea level change since the AR4. Global mean sea level rise will continue during the 21st century, very likely at a faster rate than observed from 1971 to 2010. For the period 2081–2100 relative to 1986–2005, the rise will likely be in the ranges of 0.26 to 0.55 m for RCP2.6, and of 0.45 to 0.82 m for RCP8.5 (medium confidence) (Figure SPM.6b). Sea level rise will not be uniform across regions. By the end of the 21st century, it is very likely that sea level will rise in more than about 95% of the ocean area. About 70% of the coastlines worldwide are projected to experience a sea level change within ±20% of the global mean.*" (Our underlining)

6.6 Figure SPM.6b provides as follows:



(reference: IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland: Summary for Policy Makers, page 11).

6.7 The data is summarised in the following table:

GLOBAL MEAN SEA LEVEL RISE (m)				
	2046-2065		2081-2100	
Scenario	Mean	Likely range	Mean	Likely range
RCP2.6	.24	0.17 to 0.32	0.40	0.26 to 0.55
RCP4.5	.26	0.19 to 0.33	0.47	0.32 to 0.63
RCP6.0	.25	0.18 to 0.32	0.48	0.33 to 0.63
RCP8.5	.30	0.22 to 0.38	0.63	0.45 to 0.82

6.8 Some observations:

(a) Under a stringent mitigation scenario (RCP2.6), the mean sea level rise to 2100 is approximately .4m

(b) Under the two intermediate scenarios (RCP4.5 and 6.0), the mean sea level rise to 2100 is under .5m; and

(c) Under the final scenario, very high GHG emissions (RCP8.5), the mean sea level rise is around .63m.

6.9 The sea level rise of 0.8m is at the higher end of the likely range for the final, high GHG emission scenario.

6.10 The other notable factor is that the IPCC recognises sea level rise will not be uniform across regions. Parts of the Australian coast are more erodible than others. A strategy that's appropriate for Western Australia, or even South Australia, may be unduly restrictive when transferred to Queensland.

6.11 The following Figure is drawn from a report by the Australian Government Department of Climate Change report titled "Climate Change Risk to Australia's Coast: A first pass at national assessment (2009)" citing an NTC BOM report - *The Australian Baseline Sea Level Monitoring Project Annual Sea Level Data Summary Report, July 2007 – 20008.*

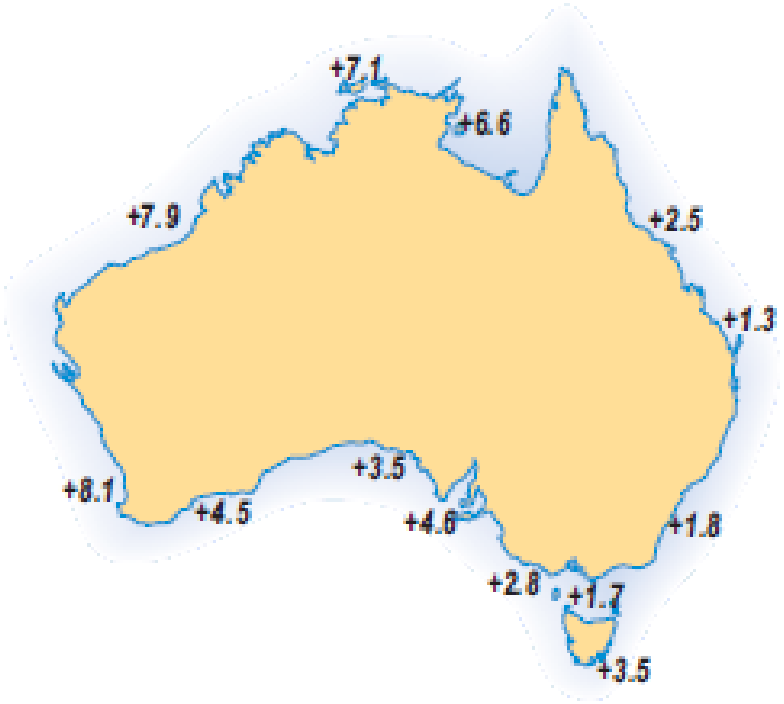


Figure 2.7 Local sea-level rise (mm/year) from the early 1990s to 2008.
Source: NTC 2008[20]

6.12 The ideal approach to adaptation is clearly one that is locality specific. A blanket application of 0.8m is not reflective of the best information available.

7. What are the drivers?

7.1 There are several drivers behind policymaking for climate change and sea level rise:

(a) Ecologically sustainable development (**ESD**);

(b) The precautionary principle;

(c) Intergenerational equity; and

(d) Risk management for local governments

7.2 Ecologically sustainable development is a longstanding concept that involves a balance between social, environmental and economic factors. Its aim is to drive decisions that integrate short and long-term factors, providing for the needs of present generations without compromising future generations. Achieving a balance involves properly weighing the risks against the social and economic consequences.

7.3 Ecologically sustainable development therefore invokes the "precautionary principle", which states that where there are threats of serious or irreversible environmental damage, a lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

7.4 The balancing exercise required by the application of ESD principles should, therefore, acknowledge the present level of information about for climate change, the social value of coastal land in the Australian and the economic need to facilitate further appropriate coastal development.

7.5 Because coastal hazards are several decades away, significant economic benefits may be lost if overly restrictive coastal planning policies are introduced now. Against that, coastal development should not drain present or future community resources - that is an intergenerational equity issue.

7.6 The real issues boil down to protection of life and protection of property. However, current debate seems to be influenced by a perceived risk of climate change litigation. How real is that risk? Are local governments really at risk of a flood of litigation stemming from coastal planning?

7.7 There are two potential causes of action – negligence and nuisance.

7.8 Claims in negligence against public authorities could arise from:

(a) the choice of standards adopted in planning schemes;

(b) decisions on individual development applications; and

(c) the choice of protective strategies such as the construction of levees, seawalls and stormwater systems.

7.9 In reality, there is a very small risk that Local governments are likely to held liable if coastal landowners suffer harm as a consequence of climate change. Planning decisions are typically characterised as political in nature and not subject to judicial scrutiny. The proviso to that is the quality of information relied upon. If planning schemes are not based on reliable or accurate information that may be cause for concern. The challenge will be keeping planning schemes in step with the best available knowledge as that comes to light.

7.10 In Queensland, decisions on individual development applications are subject to scrutiny in the Planning and Environment Court. That at least presents developers with an opportunity to demonstrate that natural processes, including those exacerbated by climate change, do not have an adverse effect on new developments, or that the long term effects of climate change are acceptable and the land can be developed with appropriate risk mitigation strategies. A negligence claim arising from a decision on a development application is highly unlikely. It would depend on whether the Council owed a developer a duty of care, and then breached that duty by, for instance, failing to advise a developer or purchaser of something seriously detrimental that only it knows about.

7.11 A negligence action is possible in connection with a Council's choice of protective strategies such as the construction of levees, seawalls and stormwater systems, or in its failure to maintain and properly manage those structures. The litigation arising out of the operation of the dams following the Queensland floods is an example of that kind of litigation.

7.12 Finally, an action in nuisance could arise if the construction of protective works by a council creates new problems for neighbouring properties.

7.13 Overall, though, the risk of climate change based litigation is low. The fear of legal liability could be removed altogether if the State passed legislation, indemnifying local governments. That would allow public policy to focus on the real issue – protecting life, and protecting property.

8. Where should we be?

8.1 The reality is that humans have been holding back the sea for centuries.

(a) Venice has been slowly sinking for the last hundred years. Sea level rises will contribute to the inundation of Venice but the City will continue to adapt. There is a planned, vertical retreat as residents abandon lower levels of their houses as the seas rise. Venice is also planning hollow floatable flood gates, to hold out the rising tides.

(b) The Netherlands relies on flood gates and other engineering solutions to keep out the sea.

8.2 The challenge should not rest on the shoulders of developers alone. Councils should also consider defensive civil engineering and infrastructure works, such as seawalls, retaining walls levees, non-return valves.

(a) In Brisbane, flood gates and blackflow devices have been installed in various locations following the 2011 floods, and the work is continuing. Remediation works at Newstead Riverpark involve the construction of new seawall.

(b) At Palm Beach, the sea wall was initially constructed by owners of beach front properties following cyclones in 1954 and 1967 (20 years before the IPCC was established). The ownership of the coastal frontage is shared between the public and private property owners. Council has since formalised requirements for the rock wall, and requires a certified seawall to be constructed prior to commencement of building development. Of the 3.7km seawall, there is around 2.6km of private seawalls and 1.1km of public (Council) seawalls.

8.3 It is important to recognise the differences between brownfield and Greenfield sites. Urban renewal sites are more constrained, within the existing network of infrastructure (such as roads).

In those cases, broader community measures such as levees and non-return values have a greater role to play.

8.4 Greenfield sites allow greater scope for control, but coastal planning should start with the basics:

(a) Appropriate building site levels above defined flood events, with floor levels, and habitable floor levels, a comfortable distance above that base level;

(b) A buffer for land genuinely affected by coastal erosion. That should really focus on land right next to the coast. Extending that requirement to inland development is highly questionable. Brisbane Markets and parts of Kangaroo Point are still located within the Erosion Prone Area but are a long way from the sea. The reality is that, once land is filled, it is developable (provided constraints and impacts are appropriately managed).

(c) Ensuring appropriate escape routes and evacuation plans are in place. Cases like *Arora Construction Pty Ltd & Anor v Gold Coast City Council* [2012] QPEC 052, which involved development on the Guragungbah flood plain, demonstrate that it is possible to minimise risk through appropriate design and risk management measures. That case saw the developer implement measures such as a voluntary evacuation system and measures to allow for shelter in place.

8.5 The "shelter in place" measures were:

(a) The proposed development was to be built on an engineered development platform, with a minimum ground floor level apartment set at RL 4.9 m AHD, providing greater than ARI 500 year flood immunity for ground floor units, of which there will be 55.

(b) Internal access roads designed to be trafficable in the ARI 1000 year event.

(c) bunding and temporary flood barriers provided to protect not only all of the units but also the car park entrance (and therefore the car parks) in all floods up the Probable Maximum Flood (PMF). This flood event is more extreme than an ARI 10,000 year event. In effect, the development, including the units and car parks, will be flood-proof. a community room/emergency centre to serve as a marshalling area for residents equipped with torches, a radio and a first-aid kit.

(d) A sump set below basement level containing adequate submersible pumps capable of operating to remove seepage at all flood levels up to and including the PMF.

(e) A managed safe water supply, on-site generated power; food rations, satellite communications and pharmaceutical notification supply scheme.

8.6 Against that background, coastal planning policy should:

(a) be locality specific

(b) respond to the best available information, and be easily capable of updating when new information comes to light;

(c) allow development proponents to demonstrate that development can respond to natural coastal process and risks can be managed through adaptable design;

(d) balance environmental risk management, economic development and social factors;

(e) encourage resilience, innovation and adaptability (in both the public and private sectors);

(f) contain clear and generous provisions recognising existing development commitments (given the uncertain and variable long term nature of coastal hazard risks associated with climate change).

9. Conclusion

9.1 Taking a hard line regulatory approach to coastal development will have major impacts on the economy.

9.2 State interests of housing supply and diversity, liveable communities, tourism, construction and development all support the desire for increased density around infrastructure/employment opportunities. Those state interests should be balanced against, not overridden, by a fear of coastal hazards. Pushing development away from existing infrastructure and employment centres will simply transfer infrastructure costs from one point to another, by reducing reliance on existing infrastructure.

9.3 Building in resilience and adaptability allows for a balance between risk management, economic development and allowing communities to live and work on the coast. That balance should be the guiding principle applied in the review of the Coastal Management District and corresponding changes to planning policy.

David Nicholls | Partner
Planning & Environment
P: +61 7 3024 0368
E: d.nicholls@hopgoodganim.com.au

Gemma Chadwick | Senior Associate
Planning & Environment
P: +61 7 3024 0377
E: g.chadwick@hopgoodganim.com.au