Urban planning and climate change adaptation

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Presentation outline

How we are responding to:

- General impacts
- Extreme weather events
- Sea level rise

- Focus on Queensland
Range of measures

- Self help
- Persuasion
- Planning & regulatory measures
- Public land acquisition (direct intervention)
Range of strategies / principles

- Precautionary principle
- Intergenerational equity
- Intra-generational equity
- Risk management
- Cost benefit analysis
- Adaptive management
General impacts of climate change

- Generally hotter
- Rainfall more variable
- Carbon constrained

For Queensland …

- Average annual temperature increases of 0.2-2.1 degrees C by 2030 and 0.7-6.4 degrees C by 2070 with the greatest warming in inland areas.

- 10-100% increase in the average number of days over 35 degrees C.

- Annual average rainfall of -13 to + 7% by 2030 and -40- +20% by 2070.
What is the answer?

Sustainable development!

- Buildings and infrastructure
- Pattern & design of urban communities
- Specific location of settlements
Buildings / Queensland

- New residential buildings (class 1 dwellings) must meet a 6-star energy performance standard.
- New units (class 2 dwellings) must meet a 5 star average energy performance standard.
- New commercial buildings must meet a 4-star energy performance standard (ABGR).
Buildings and infrastructure: Qld

- Recognition of outdoor living areas (up to 1 star) and solar panels (1 star).
- From 2009, hard wired air conditioners must be a minimum 4 star energy rated.
- In class 1 and class 2 buildings shower heads must be a 3 star WELS rated or better; toilets must be dual flush and 4 star WELS rated.
Incentives and educational measures

- $339.3 million in Home WaterWise Rebates Scheme (2006-2008)
- $500,000 on Home EnergyWise tools for household efficiency
- $1.5 million on a Climate Smart living public awareness campaign
- Green Door for sustainable projects
A compact urban structure of well planned communities, supported by a network of accessible and convenient centres and transit corridors linking residential areas to employment locations establishes the context for achieving a consolidated urban settlement pattern.

The population of SEQ is expected to increase from 2.8 million in 2006 to 4.4 million in 2031 … (requiring an additional 754,000 dwellings). (p.91)
Specific locations

- Avoid hazardous areas
- Improve the design of development and infrastructure
- Improve community preparedness to respond to natural hazards
- Enhance the resilience of natural systems

SEQ Regional Plan, p.44
Some more ideas …

- Permeable pavements, roof top gardens, tree planting
- Tropical design guidelines – ventilation, set backs, communal open space, roof orientation
- Bush land corridors, mangrove buffers etc.
Sustainability conditions and the law

- There is a need to be selective in applying ESD conditions and they should not be applied "globally". They should be proportional and relevant to the scale and nature of the development.

- The requirements imposed by, or as a result of, a condition should not exceed what is reasonable to expect of the developer.

- Unless a council can show that an ESD type condition has a nexus with a transparent council ESD strategy or guideline, the tribunal would be reluctant to allow such a condition, just for the sake of it.

Jolin Nominees Pty Ltd v Moreland City Council [2006] VCAT 467 at [54]
Extreme weather events

- Heat waves
- Bush fires
- Flooding
- Cyclones and storms
2010 Inland Flooding Study (LGAQ)

- **Purpose**: An improved methodology for assessing inland flood risk while accounting for climate change.

- **Multiple flood hazard zones**: A major step forward in shifting the focus from the 1% AEP (Q100) as the only relevant flood level for residential development to the reality there are varying levels of flood risk that local governments need to consider. (p1)
Multiple flood hazard zones: methodology

- Assume a 5% increase in rainfall intensity per degree of global warming - to be factored into the Q100, Q200 and Q500 AEP

- Assume a temperature rise of 2 degrees by 2050, 3 degrees by 2070 and 4 degrees by 2100

- Develop 3 flood maps - for 2050; 2070 and 2100 – showing changes to AEP flood extents over time; or

- Assume Q100 levels will apply to existing Q200 areas by 2050 and Q500 areas by 2100.
Applying the methodology

1. Choose the map which best covers the asset life and location of a development proposal.

2. Apply the Flood Constraint Code which outlines appropriate land uses for each of these hazard areas.

3. Distinguish between proposals already subject to a development commitment and other land.
Other recommendations

✓ Apply flood resilient design and lay out.

✓ Maintain a network of evacuation routes.

✓ Facilitate development in lower probability flooding areas.

✓ Maintain local flood plain processes.

✓ Maintain critical emergency infrastructure and services during flood events.

✓ Ensure functionality of community infrastructure during and immediately following flood events.
Purpose:

- To manage development outcomes in the floodplain so that risk to life, property, community and the environment during future flood events is minimised; and
- to ensure development does not increase the potential for flood damage on site or to other property.

Deals with:

- Chance of a flood occurring
- Design issues to manage flood impacts
Chance of flooding?

☐ Comprehensive analysis

☐ Catchment based

☐ Identifies where floods have occurred (or are likely to occur)

☐ Optional to use

☐ No binding triggers or thresholds
Design for flooding: Interim Floodplain assessment overlay code

- New buildings should be:
  - located outside the overlay area; or
  - located on the highest part of the site; or
  - be elevated.

- New buildings should be provided with clear and direct pedestrian and vehicle evacuation routes off the site.
  - No cul-de-sacs
  - Signage provided on site
Design for flooding: Interim Floodplain assessment overlay code

- Residential dwellings should not be constructed as single storey slab on ground
- Works in urban areas should not involve any physical alteration to a water course or floodway including vegetation clearing or a net increase in filling
- No hazardous materials should be stored or manufactured on site
- Material, manufacturing equipment and containers should be located above the flood level
- Low density residential development (exempt or self assessable) – model code does not apply
Working towards …

A floodplain management plan that will:

- facilitate the use of the floodplain for appropriate purposes;
- limit flood hazard and damage to socially acceptable levels;
- enhance the waterway and floodplain environment; and
- foster flood warning, response, evacuation, clean-up and recovery in the onset and aftermath of a flood.
BCC FloodWise Campaign

- Education campaign – how to prepare for floods
- Free, site specific property reports
- Free SMS early warning for severe weather alerts
- Voluntary buy-back scheme
Voluntary buyback scheme

Eligibility criteria:

1. The property must be flooded during a two year ARI flood event.
2. The property must be in a residential zone.
3. Flood waters must inundate the residential dwelling on the property.
4. There is no other viable infrastructure solution (such as pipes) available to remove the flooding problem.

Properties acquired under the Voluntary Home Purchase Scheme will be assigned an appropriate non-residential use which has a range of environmental and social benefits. The land may be used for conservation, drainage easements or parklands.
Sea level rise

- Coastal settlements
- Tourism
- Indigenous communities
Communities and development should be protected from adverse coastal hazard impacts taking into account the projected effects of climate change and allowing for the natural fluctuation of the foreshore and foreshore ecosystems to continue. (Principle 2)
Queensland Coastal Plan, 2011

Assumptions:

- Sea level rise of 0.8 m by 2100.
- Increase in the maximum cyclone intensity of 10% by 2100.

Method:

- Requires identification of high and medium coastal hazard areas in local planning schemes.
- Distinguishes between existing development and new development; urban and non urban areas.
Non urban land: what’s allowed?

- Land outside an existing urban locality and within a coastal hazard area should *not* be allocated for urban purposes.

- EXCEPT, development in a non urban, coastal hazard area may be acceptable if it is:
  - coastal-dependent development (residential development in any form is *not* coastal dependent development)
  - development that is temporary, readily relocatable or able to be abandoned;
  - essential community infrastructure that cannot feasibly be located elsewhere; or
  - redevelopment that does not increase the risk to people and property from exposure to adverse coastal hazard impacts. *s 2.2.1 development*
Urban land: what’s allowed?

High coastal hazard impact areas:

- Development consistent with s 2.2.1; or
- Development consistent with a relevant adaptation strategy; or
- If an adaptation strategy has not yet been incorporated into a local planning instrument, development which:
  - Does not increase the intensity of development on the premises; or
  - Includes a risk assessment showing how adverse coastal hazard impacts can be mitigated; and a relevant development application is made within three – five years of the commencement of the SPPCP (s 2.5.2).
Urban land

Medium coastal hazard impact areas:
As for high coastal hazard impact areas but with more limited risk assessment requirements and no time limitations.

Greenfield sites:
Development within a greenfield area must be located outside a high coastal hazard area.
For high coastal hazard impact areas, NO intensification of land except in accordance with an adaptation strategy.

Section 2.2.1 development allowed.
What is an adaptation strategy?

An assessment of the mitigation options (including retreat, avoidance and defence) and a cost benefit analysis taking into account long term social, financial and environmental factors.
Risk science to inform planning

- Coordinate and **synthesise** emerging scientific knowledge and traditional knowledge.

- Use **cost-benefit analyses** to select management responses that maximise ecological resilience while minimising social and economic costs.

- Align and **integrate** recommendations from this Strategy with the TSRA *Torres Strait Development Plan 2009-2013* (and future Development Plans) and regional service delivery plans.
Emergent principles and strategies

- Precautionary principle
- Intergenerational equity
- Adaptive management
- Cost-benefit analysis
- Risk management
- Whole of government /integration
- New v existing development
So where are we at?

There is a clear role for state governments in creating the right conditions and incentives for households and businesses to manage their own climate risks.

State governments also have a key role in ensuring planning, regulatory and market frameworks appropriately deal with climate risks.

What is less clear, is the extent to which states should use planning and regulation to minimise private risks, for example, by requiring adaptation measures as a condition of development or even prohibiting development in certain high-risk areas.
Why can’t we decide?

- Uncertainty – contested facts; range of solutions; long term horizons
- Unpopular – cost, fear, uncertainty
- Communication – two way

➢ Risk management, but what about …

risk allocation?