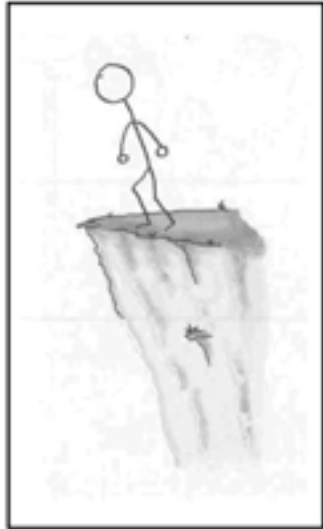


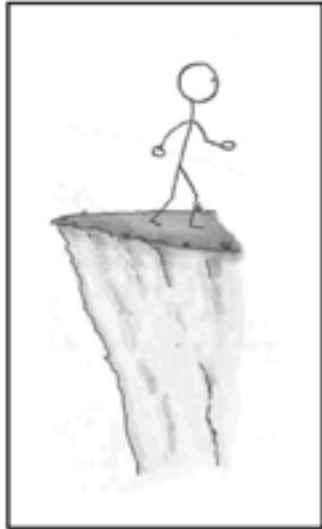


The Risk Business: Thriving in a Rapidly Changing World

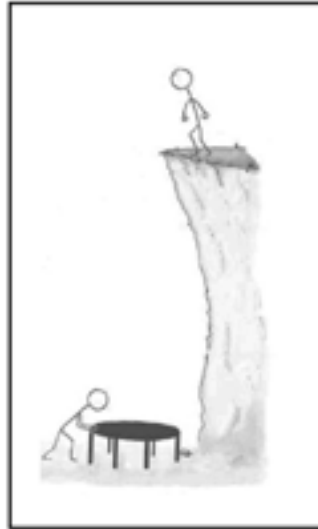
My risky geo-design journey to Redlands



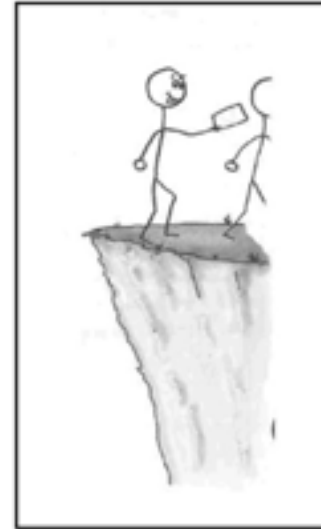
Your project



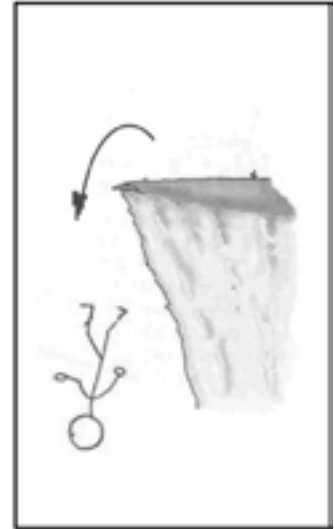
Avoid



Mitigate



Transfer



Accept

Knowns, ...Unknowns, ...Super unknowns...



Managing, Mitigating risk by Diversification or Spread...



*"I was spreading some risk around, and apparently
it all wound up in your portfolio."*

Natural disasters and media sensationalism



Business risk



- Measuring up
- Risk amplifiers
- Risk minimisers
- Costs
- Integrating geo-design

Risky business... Corporates & Characters



Shylock, in *The Merchant of Venice*



Gordon Gekko, in *Wall Street*



Risky business... Varying and ...*different*... risk appetites



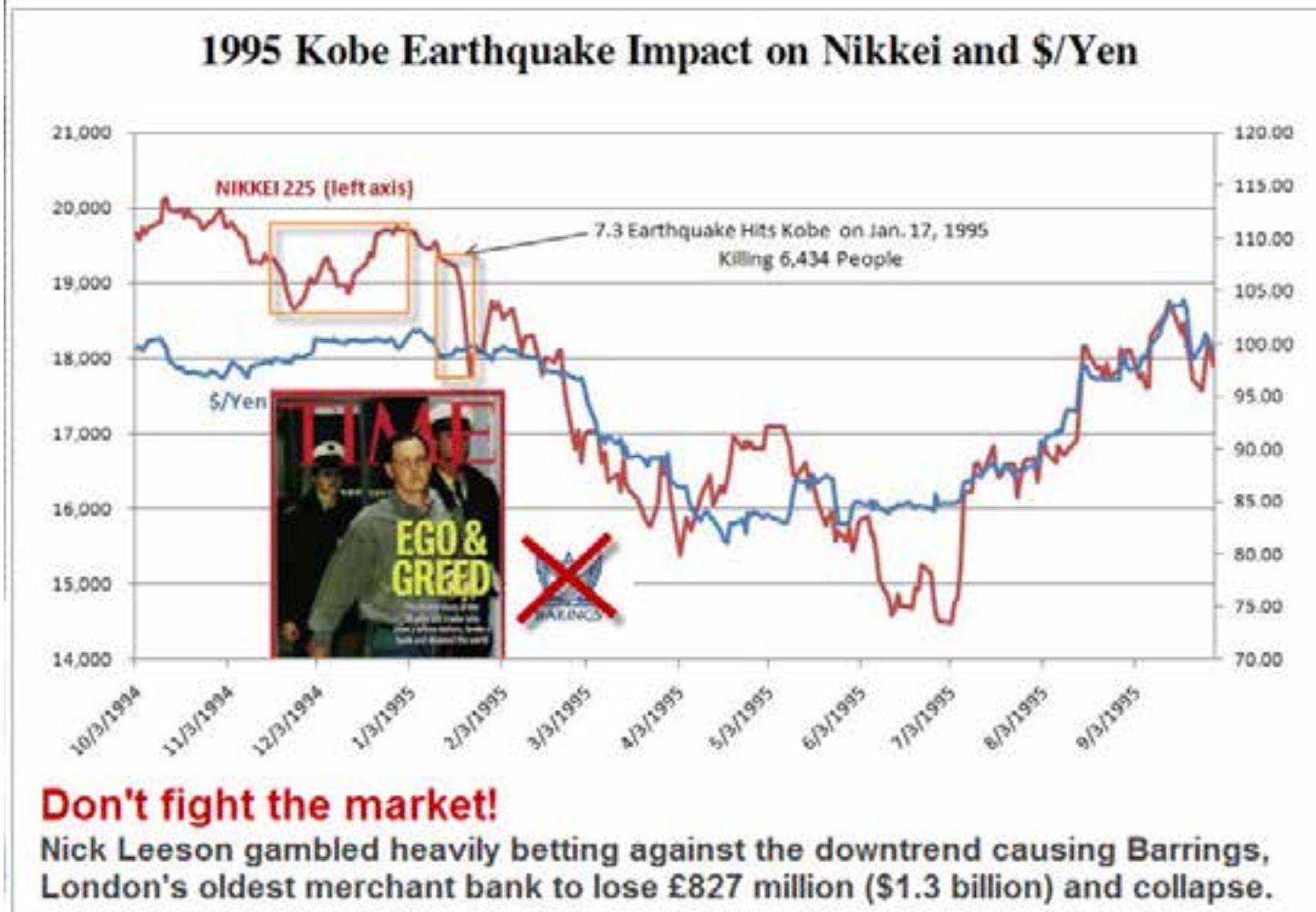
Nathan Rothschild



Goodfellas



Risky business... And natural disaster strikes!



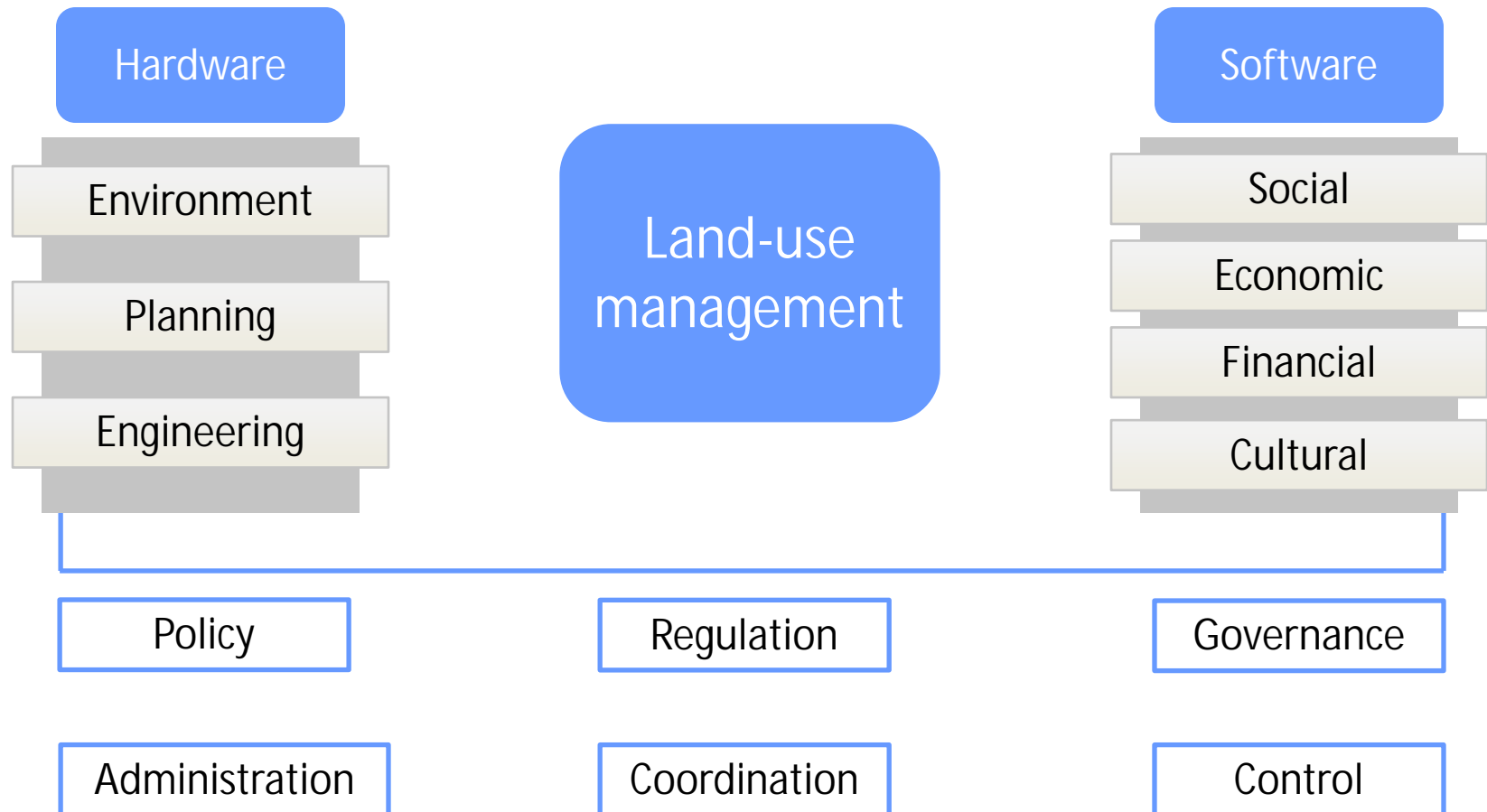
Business risk

- Risk is all about perspective... and *sentiment*...
- Financing of housing is increasingly risky... and expensive
- A new discourse: Integrating geo-design and business risk management

Geo-design – A sequence of practical steps helping improve the quality of urban environments and supporting decision makers in their efforts to minimise financial risk

- Proposed dialogue:
 - Better understanding of a landscape's layers
 - Where investment are located
 - Independent & composite risk

The risks in our world... A complex value chain



The risks in our world: Natural disasters



Applying geo-analysis and geo-design scenarios to the Brisbane flood

- Analysis of population, housing, and financial indicators '*at risk*'
- The impact of the flood on the city's housing market and its finances
- Geo-design responses

Brisbane Flood Case Study



Map 1: Australia & SE Queensland

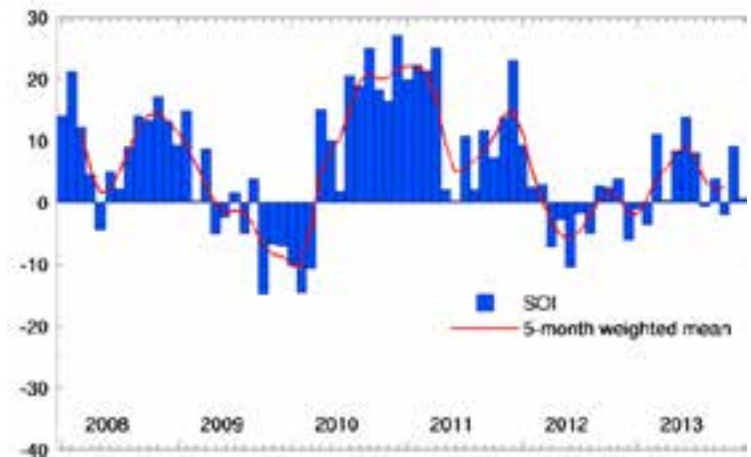
- Brisbane is the capital city of Queensland
- 3rd largest city in Australia
- Population of 2.19 million people
- Covers a land area of 5,950 km²
- Population growth 1971-2011: 2.22%
- Population growth 2014-2031: 1.96%

Brisbane Flood Case Study

Map 2: Land use map of South East Queensland

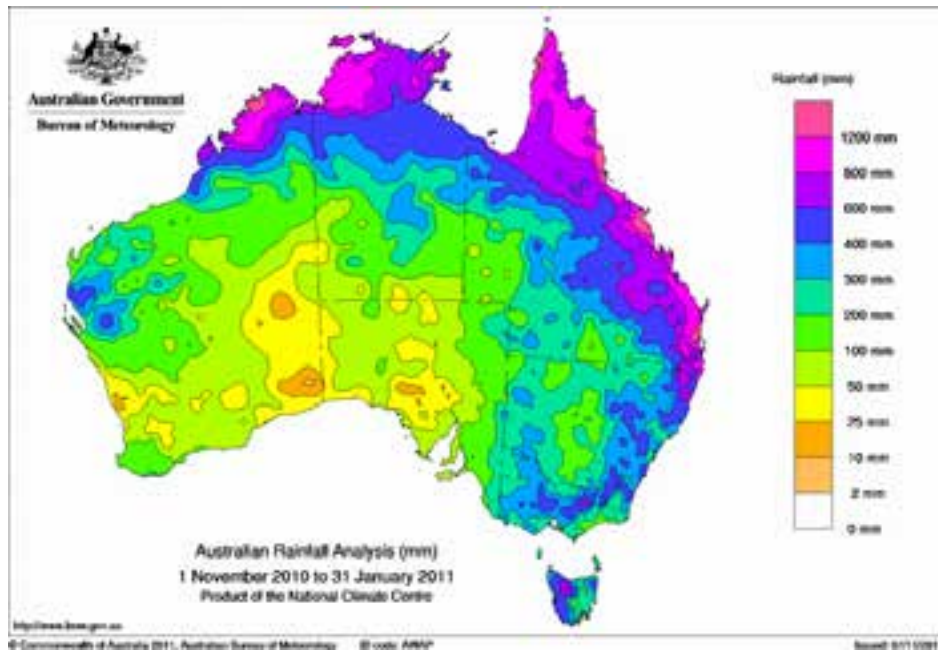


Figure 1: Southern Oscillation Index

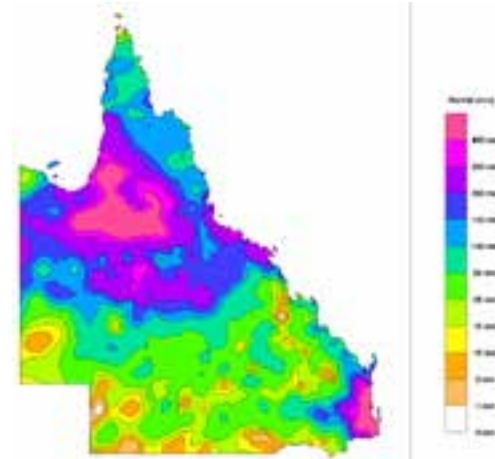


Precipitation levels: Cause I

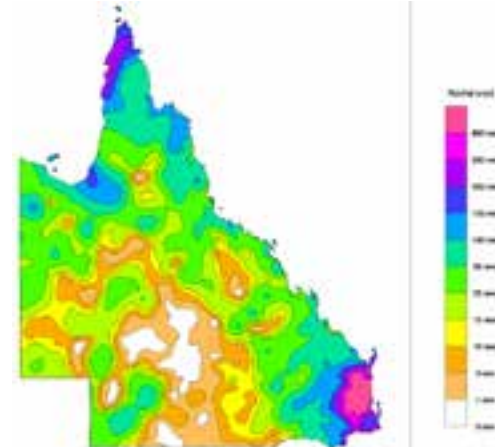
Map 3: Australian rainfall, 3 months to January 31, 2011 (mm)



Map 4: Queensland rainfall, week ending 27th January 1974 (mm)

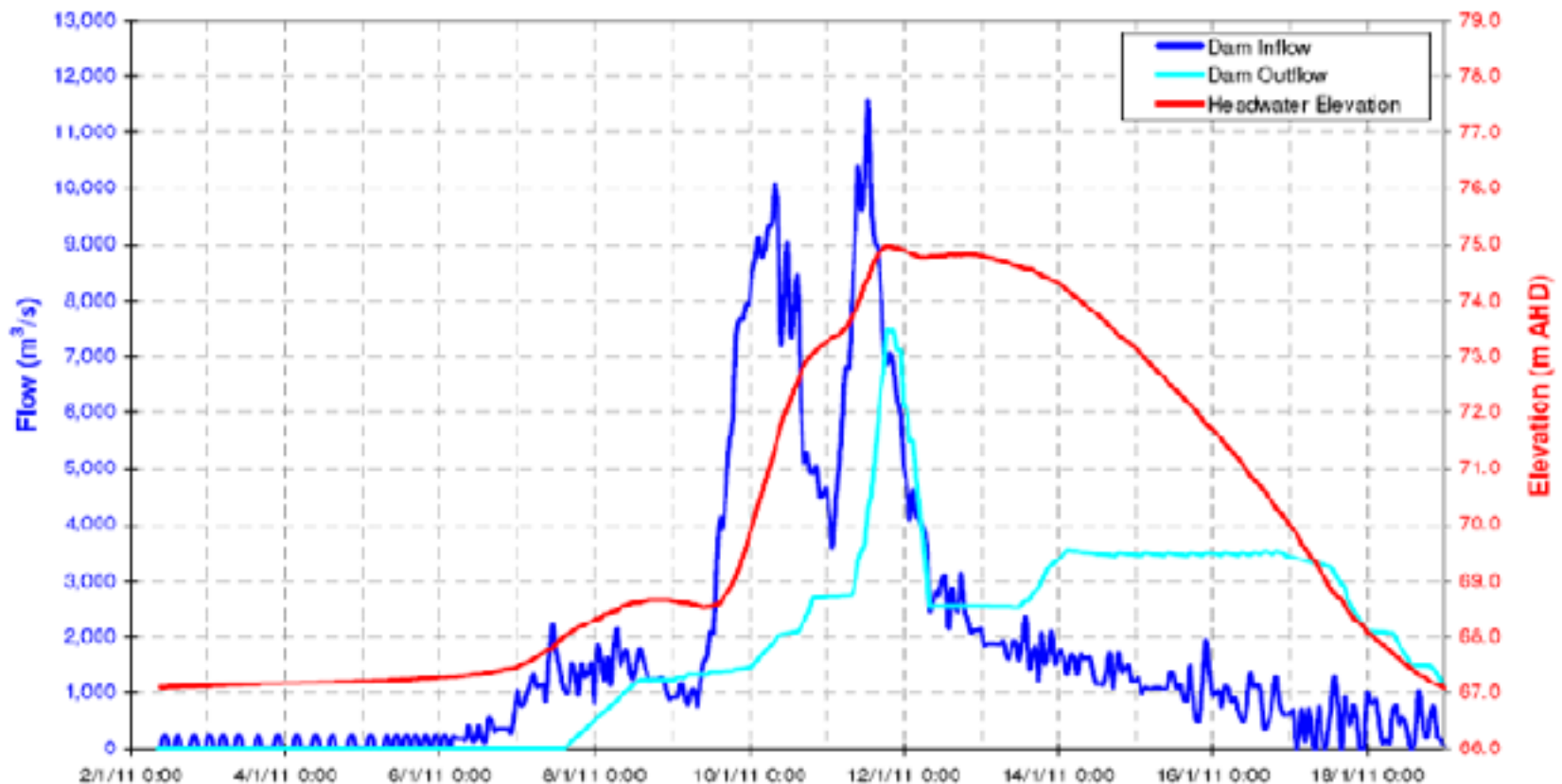


Map 5: Queensland rainfall, week ending 12th January 2011 (mm)



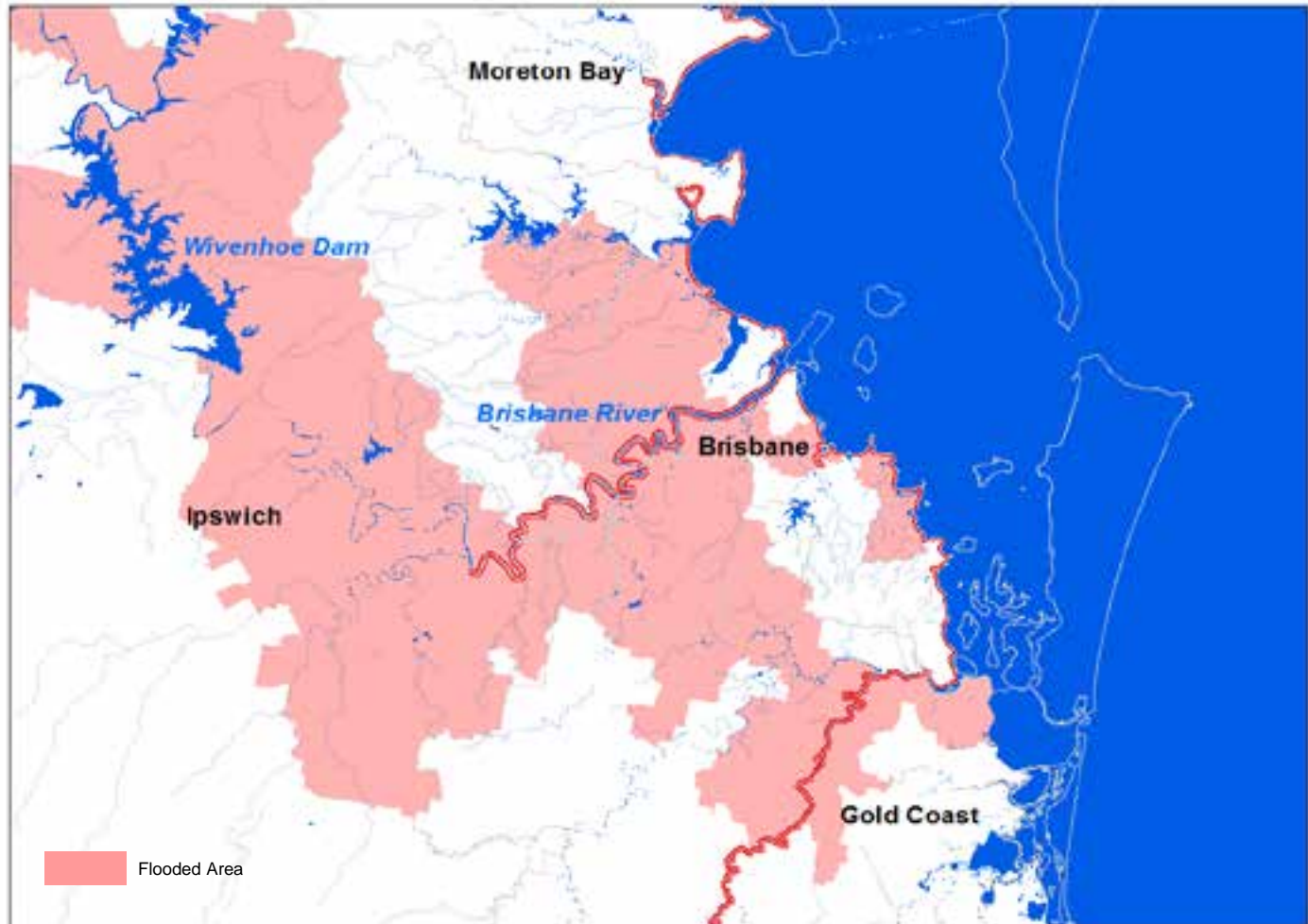
Wivenhoe Dam: Cause II

Figure 2: Water inflow/outflow from Wivenhoe Dam



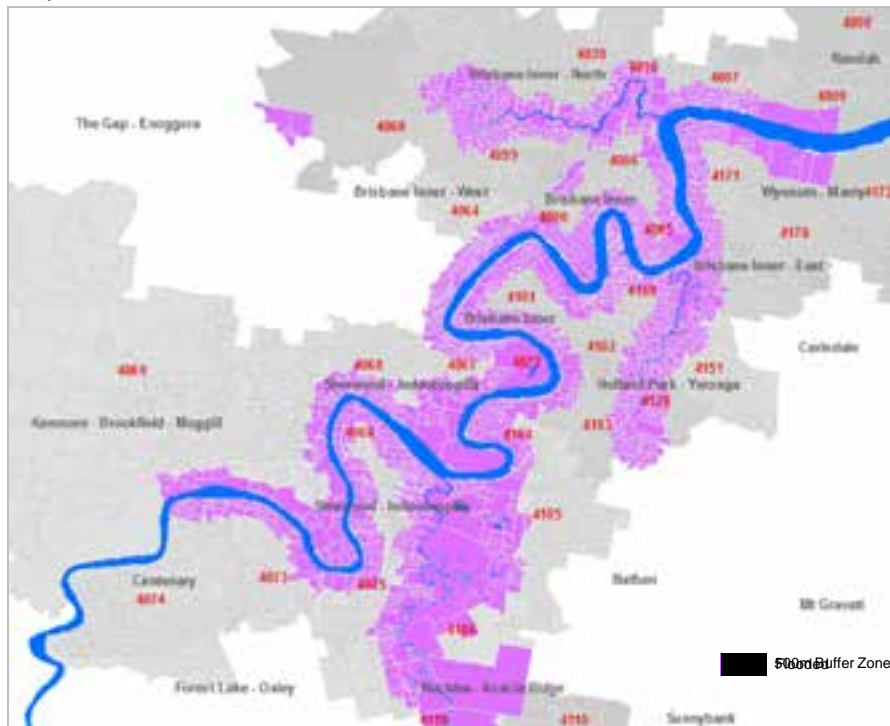
Brisbane flooded: The effect!

Map 6: Flooded area of Brisbane



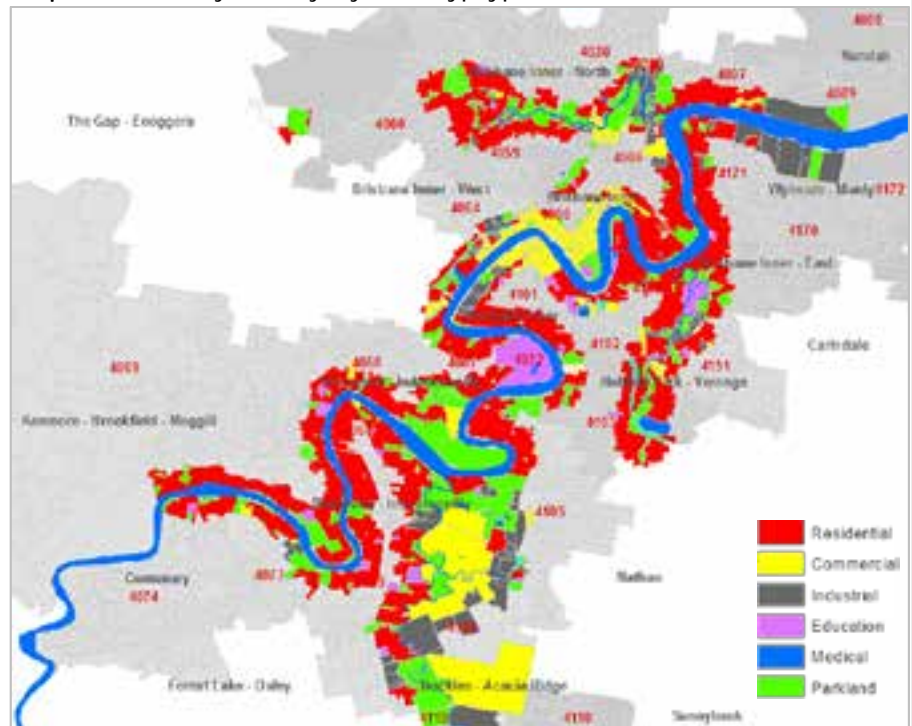
Case Study: Inner Brisbane, Scenario 2

Map 7: 500m buffer zone



Land Parcels	Area km ²	Persons	Dwellings	Persons per km ²
1,522	44.51	115,040	23,963	2,584.59

Map 8: 500m buffer zone by land use type



Commercial	Education	Medical	Industrial	Parkland	Residential	Transport
5.83km ²	0.66km ²	0.34km ²	4.33km ²	9.04km ²	23.97km ²	0.34km ²
13.10%	1.48%	0.76%	9.74%	20.30%	53.85%	0.76%

Model A: Brisbane Housing Market: 2006 - 2016

Figure 3: Supply/demand imbalance of houses

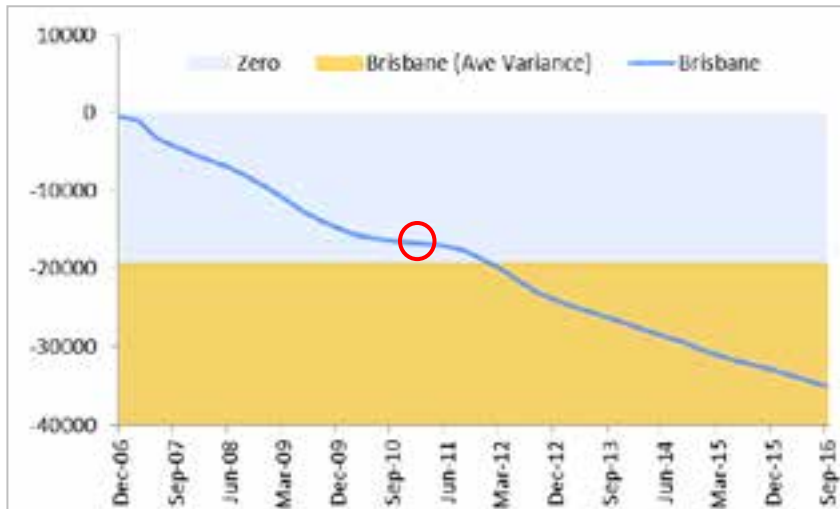


Figure 4: Average price of houses, standard variable rate (*interest rate*)



People & Housing: Demand, Supply, Density

Figure 5: Population growth (%)

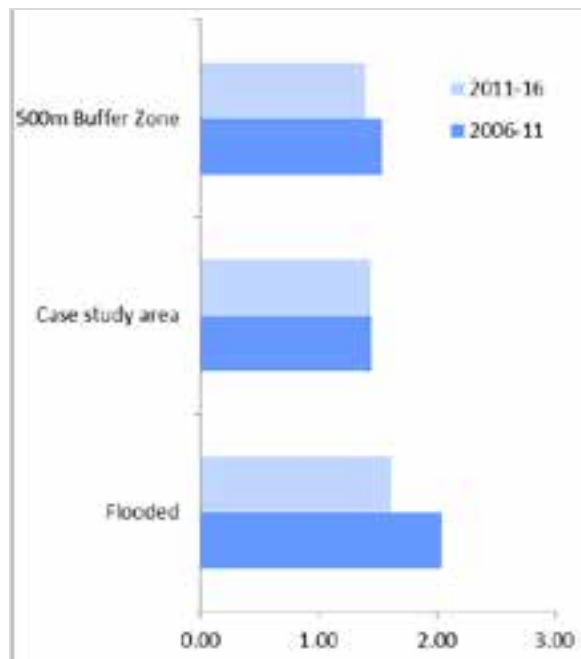


Figure 6: Stock growth (%)

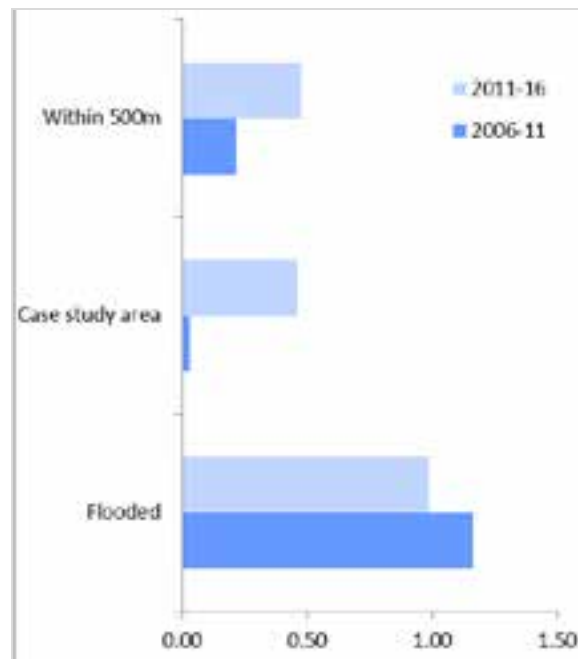
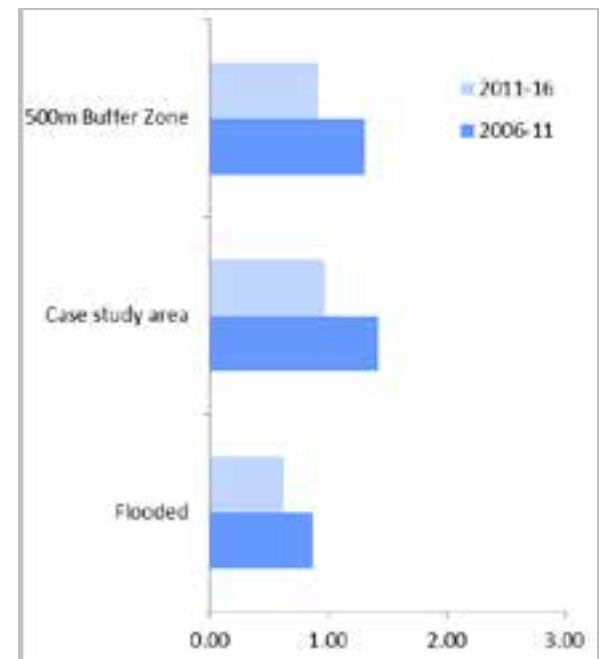


Figure 7: Persons per dwelling growth (%)



Housing Finance: Mortgages, Prices, Repayments

Figure 8: Mortgage growth (%)

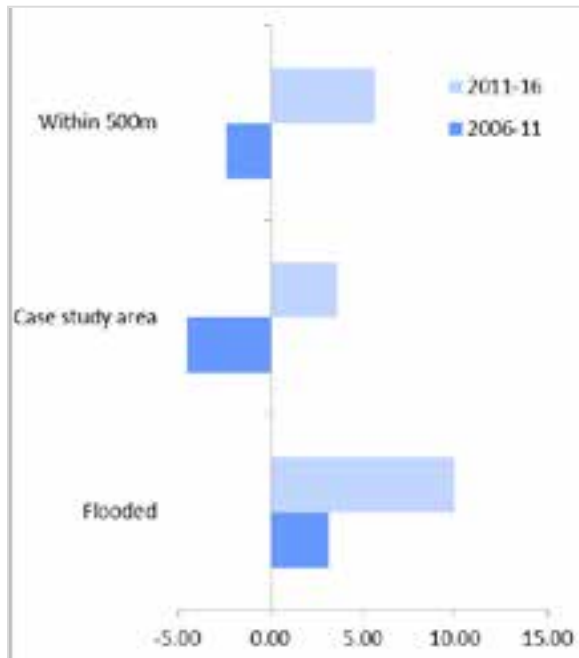


Figure 9: Average price growth (%)

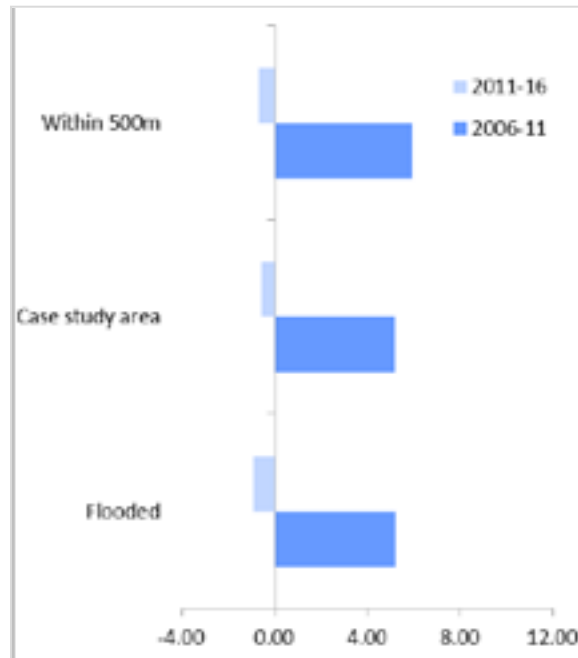
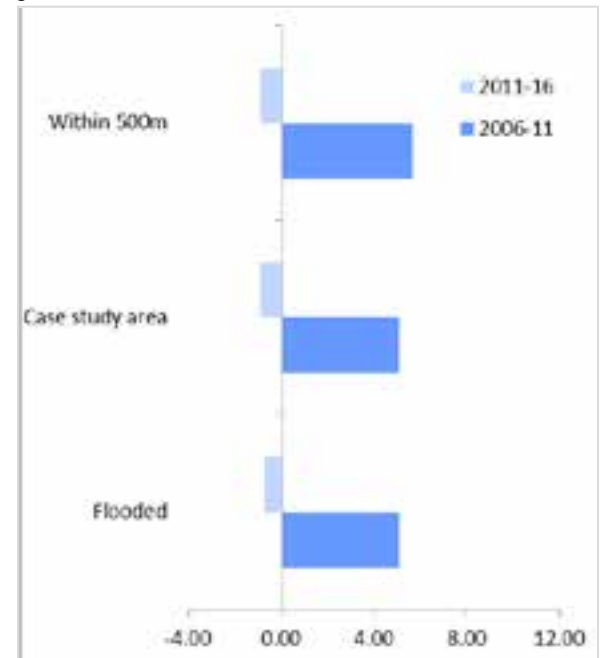


Figure 10: Average mortgage repayment growth (%)



Would a geo-design approach help minimise risks?

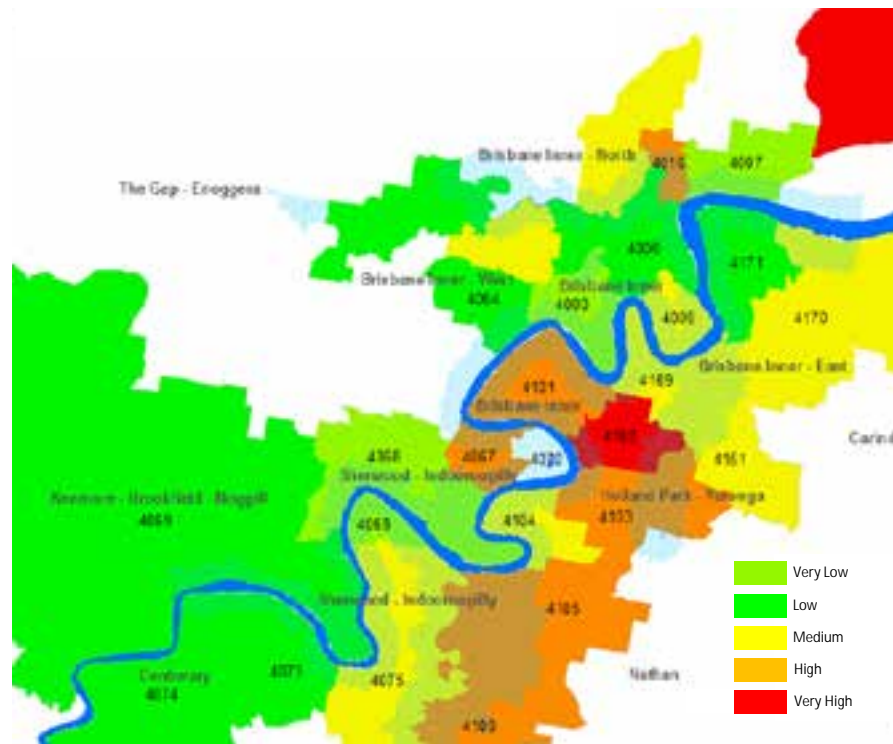
- Cities are complex systems with endless interactions
- Geo-design: an integrated framework using geo-processing tools capable of testing hardware and software (in)compatibility
- Causes:
 - Analysing populations at risk to '*existing*'/'*alternative*' hardware and software scenarios
 - Taking a '*holistic*' approach to: better understand, measure, and evaluate the impact of land use challenges, and the burdens in financial services
- Effects:
 - Improving policy and market sentiment
 - New land use strategies: how to manage & develop housing in flood risk areas
 - Encouraging new strategies in property and financial services decision making

Model B: The risk impacts of flooding on housing finance

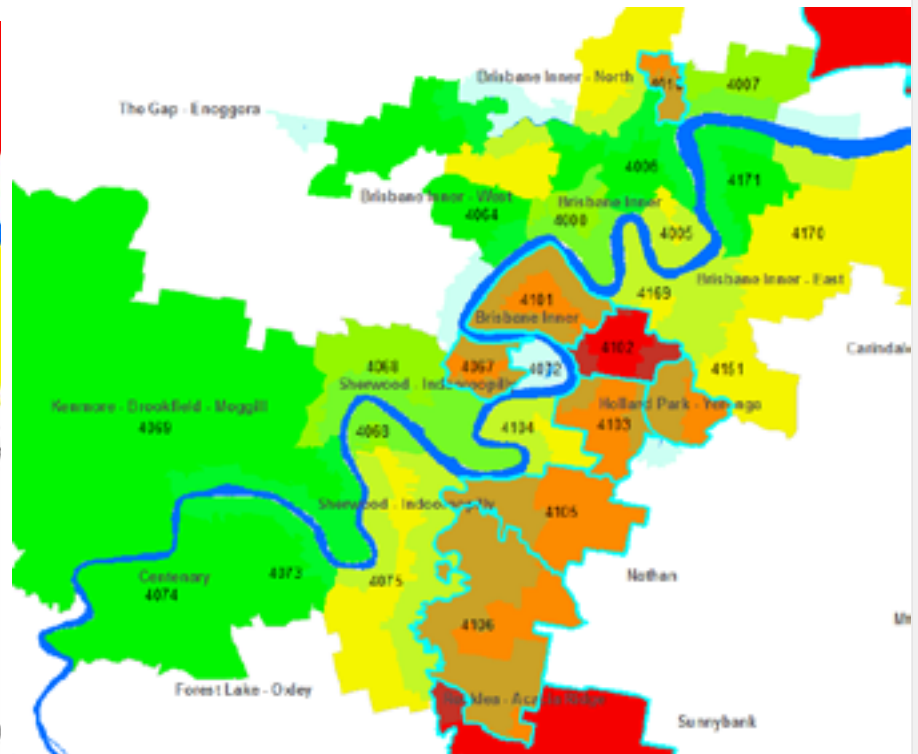
- Brisbane: from country town to *Metropolis*
- The quest for home ownership... an asset, but a liability...
- Property development bonanza
- Impact: corners cut in land-use planning
- Onset of the GFC
- Reserve Bank of Australia (RBA) response gave rise to an out of sync and more volatile mortgage market
- Created more debt = more exposure = **more risk!**
- A highly leveraged residential market, then a flood = **even more risk!**
- Impact: deterioration in credit quality =
- **PROBLEM!**

Housing Affordability (LHS), and Housing Affordability greater than 30%, (RHS), September 2011

Map 11: Affordability

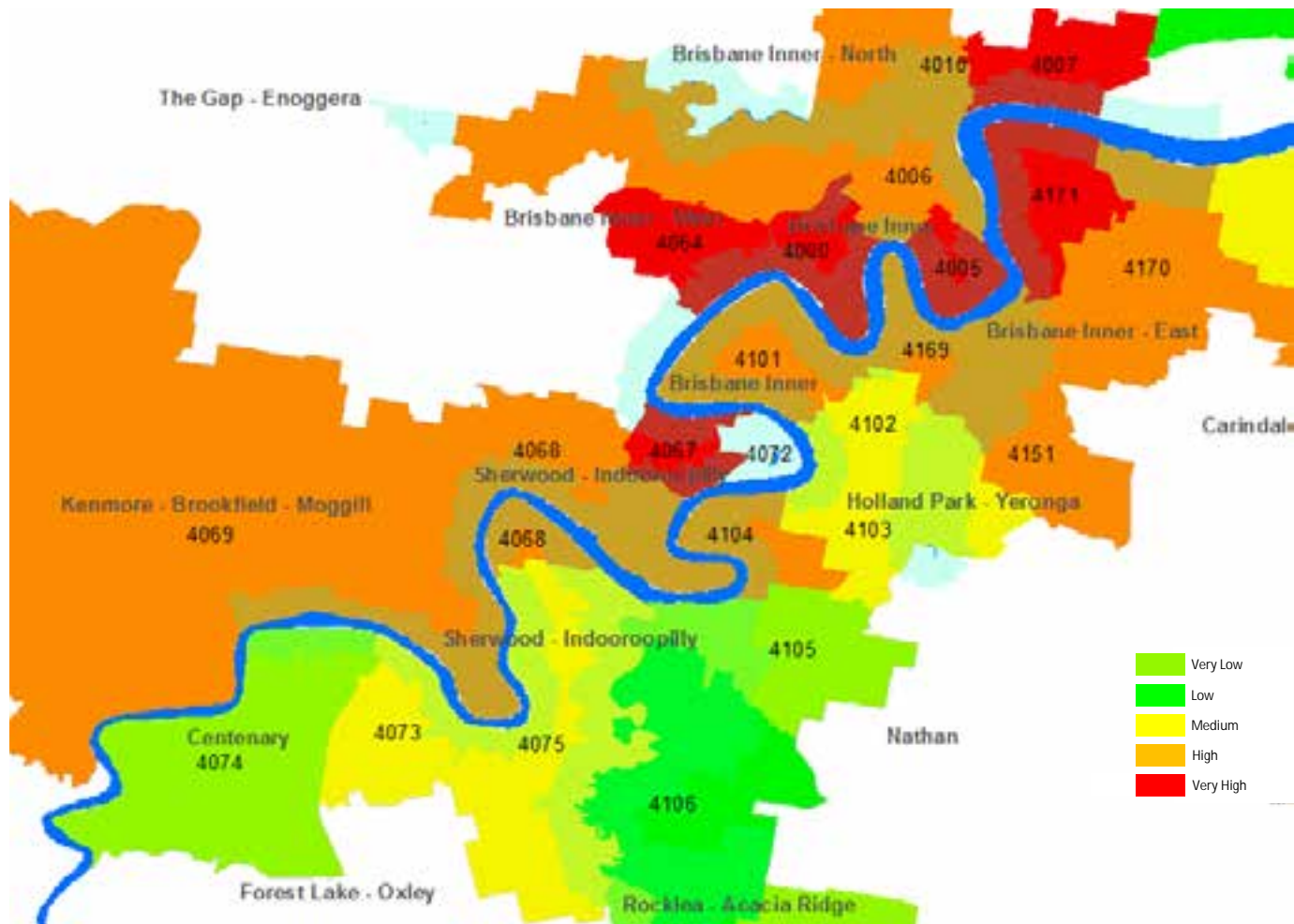


Map 12: Affordability above 30%



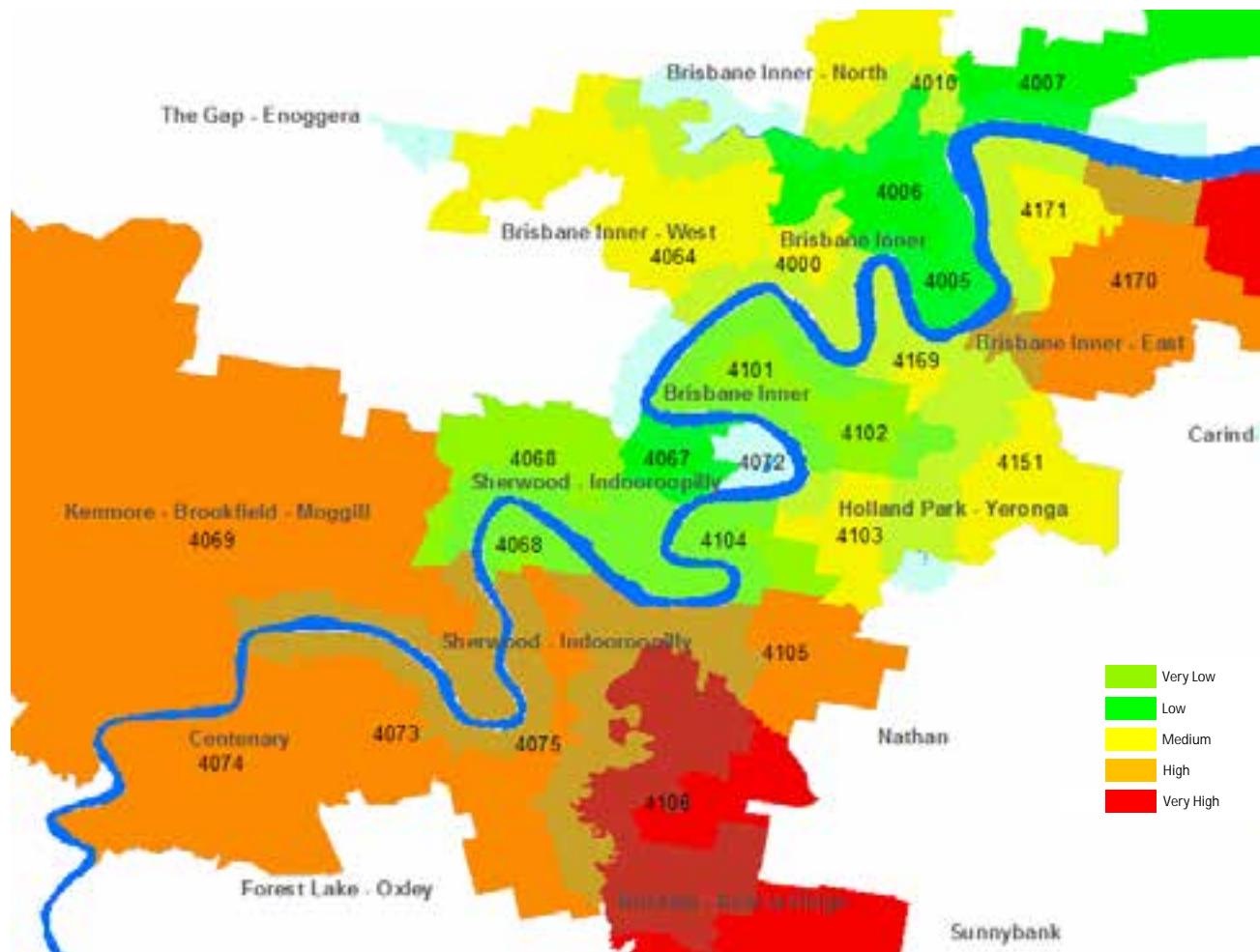
Mortgage repayments greater than \$3,000 per month, September 2011

Map 14: Number of households with a mortgage repayment greater than \$3000



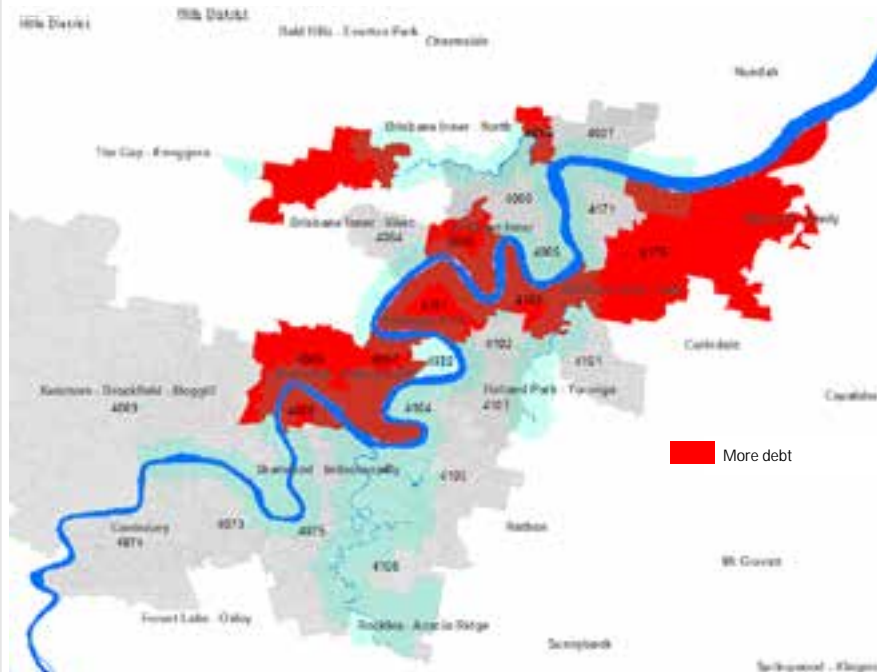
Average level of mortgage debt (Loan to Value Ratio), September 2011

Map 15: Average level of debt

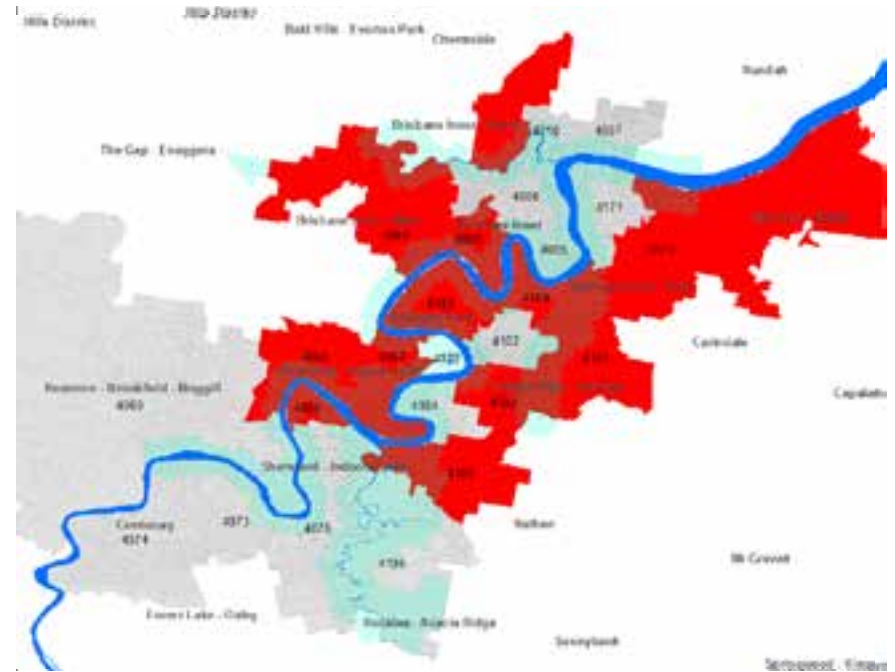


Negative Liquidity Growth, 3 year maturity (LHS), 6 year maturity (RHS), (% change)

Map 16: Change in liquidity between Dec 2010 and Sept 2013



Map 17: Change in liquidity between Dec 2010 and Sept 2016



The Good, the Good, and the not so Good...

- An overwhelming response from the Australian public (and taxpayer!)
- Overhaul of water and disaster management
- Geo-design: active and visible role in decision making (policy and financial)
- Geo-design: critical in the establishment of riverine insurance
- Geo-design: facilitating State Government accountability



Only 10% of the \$2.1 billion in claims have been paid!

One for the money, ...Two for the money, ...Three for the money

- Risk minimisation and asset protection
- Hedge funds, re-insurance, and CAT bonds



QBE



Recovery of Brisbane: **At a cost!**

The geo-design code

- Land Use Planning
 - Nurturing hardware and software compatibility
- Financial Services and banking
 - Overcoming cultural biases to non-conventional financial analysis (geography, geo-design)
- Flooding
 - In Queensland geo-design and broader GIS technology is an active tool in planning, and now credit evaluation and decision making

Future: geo-design strategy

- A core concept in urban design, planning and financial management
- But how do we better manage, coordinate, and control our flooded cities in the 21st century?
- Floating cities
 - Amsterdam, Venice, Kolkata, Bangkok, Alexandria
- The alternative... Flooded cities
 - *Atlantis...*



THANK YOU

Paul M. Ross ▪ Futurist & Data Broker