Low Impact Urban Design and Development

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Presented to Topenergy and Tsing Hua, University: Beijing. June 2007
Auckland NZ
Overview

- Urban development in NZ
- Growing Auckland
- Low Impact Urban Design and Development
Urban development in NZ

• 65% expected to live in urban areas world wide by 2050

• 87% of New Zealand's population currently live in an urban area

• 50% of population will be living in Auckland region by 2050, 30% today

• Auckland’s population grows 2-3 times faster than rest of NZ
Growth of 8 largest cities

PROJECTED POPULATION GROWTH (2001 TO 2021)

Data source: Statistics New Zealand.
Growing Auckland

- 49 new people a day in Auckland
  - = 21 houses required
    - = 1 hectare of new land for housing
    - = 35 new cars
  - 14 years of land supply left
- Currently 13% of urban area covered in roads
- 22 million kilometres travelled a day by Aucklanders in their vehicles
- 900 tonnes of carbon monoxide released into air
  - Predominantly form cars

More houses with fewer people?

Figure 6: Number of household occupants and number of households in the Auckland region (1956 to 2001)

Source: ARC 2005
Auckland City: potential household capacity (2001-2021)

Immigration from Asia

• Almost 240,000 or 1 in 15 people in New Zealand were of Asian ethnicities in 2001

• In the Auckland region, 1 in 9 people were born in Asia

• The Asian population of the Auckland Region is expected to increase by at least 50% by 2016

• In Auckland City, over one-third (36 %) of residents will be of Asian ethnicity by 2016, up from 20 percent in 2001.
  • From 77,000 - 177,000

(Source: Auckland Regional Council, Statistics NZ)
A few ‘not so good’ aspects of urban development

- Emissions from transport and industry affecting air quality
- Heavy metals and waste polluting beaches and streams
- Use of non-renewables for energy
- Sedimentation of estuaries
- Reshaping of topography and highly modified landscapes
- Increasing impervious surfaces
- Reliance on cars
- Obesity
- Respiratory illness
- High infrastructure development and maintenance costs
- Impact on surrounding areas – food production, fertile lands, provision of water and electricity
- Light pollution
Is it possible to do things differently?
Alternative Urban Development

Low Impact Urban Design & Development:

- Urban Form
- Energy production and use
- Green corridors and biodiversity
- Human scale and connectivity
- Integrated water management
- Natural systems as infrastructure
• Use of solar energy private and commercial

• Use of existing topography, and minimal modification to landscapes.
Conventional stormwater approaches

Water is quickly carried across impervious areas and taken out to sea via a series of pipes.

- **Priority**
  - Remove water from land quickly and efficiently
  - Centralised infrastructure managed by council or company

- **Techniques**
  - Kerb and channelling
  - Piping
  - Paving

- **Environmental impact**
  - Deterioration of streams, estuaries, biodiversity
  - Pollutants and sediment taken out to sea
  - Sewerage overflow into stormwater pipes
  - High level of sedimentation created during initial earth works and construction
Run off from construction site
LIUDD: Integrated water management

- Three waters: potable, waste, storm

- Alternative stormwater management:
  - Relies on technologies that use natural processes
  - Minimises environmental damage
  - Manages stormwater at source
  - Encourages re-use
  - Enhances ecosystem and human health
LIUDD focuses on minimising bulk earth works...
containing sediment run off...
managing everyday events...
and reducing impervious areas.
The LIUDD research programme

• Purpose
  – Supporting the use of alternative urban development approaches.
  – Designing and testing appropriate stormwater management technologies
  – Understanding how indigenous biodiversity can be enhanced
  – Promoting improvement of freshwater and terrestrial environmental quality
  – Exploring the performance of low impact urban form
Research Design

We have 5 objectives:

1. **Getting buy-in**: What stops people from using LIUDD techniques and what encourages its implementation?

2. **Technologies & ecosystems**: Do the LIUDD techniques work, how and in what contexts?

3. **Performance**: How does LIUDD compare to conventional development at lot, neighbourhood and catchments scales?

4. **Economic value**: Are the techniques financially viable, what are the long term economic consequences?

5. **Changing plans and practices**: What changes to planning practices support implementation of LIUDD?
Objective 2: Technologies & ecosystems

1. What pollution are we generating (and how is this transported)?)

2. What impact does pollution have on the environment?

3. What pollution can be removed by existing devices / treatment trains?

4. How can devices and systems be modified for increased performance?
Landcare databases show which aquatic invertebrates occur in good quality Auckland streams.

*Acroperla* stonefly  *Polyplectropus* caddisfly  *Austrolestes* damselfly  
*Paranephrops* crayfish  *Hydrophilid beetle*  *Zephlebia* mayfly
Example: Landcare Building
Objective 4: Economic value

- What are the private and community costs and benefits of using a low impact approach?

- How are the costs and benefits distributed among the stakeholders?
Economic value: Methods

• Life Cycle Costing projects
  – Auckland Region LCC Database
  – Costing relationships for the Auckland Region
  – Glencourt Place
  – Alison Development

• Life Cycle Analysis project
  – Paul Matthews Raingarden

• Hedonic pricing project
  – Market acceptance of LIUDD

• Discussion documents
  – Funding options for sustainable stormwater management
  – The influence of the current land development process on adoption of LIUDD
Objective 1: Getting buy-in

1. What are the factors stopping use of LIUDD in the development industry and how are these being overcome?

2. How is LIUDD being implemented in NZ?

3. How do people know that their LIUDD goals are being achieved or what the impact of their actions is?
Rejuvenating an urban park
Their perception of high density is a lot different to maybe the other ethnic groups... I suppose you could say they don’t have high expectations of it. They’re very happy where they are and [with] what we’ve delivered them. We’ve over delivered in their view. We get people saying to us - ‘What’s wrong with walking up two flights of stairs to get to the second storey, you know what’s the problem with that, why do you need a lift. You know you people are lazy’. - A seventy five year old Chinese guy telling us that we were lazy, we were discussing whether we should have lifts or not and he goes -‘why’?

(Interview state housing official)
Stakeholders in a sustainable cities project

I felt very privileged to be invited to participate. People genuinely wanted to hear my voice. This is the first time in my life someone from the government has asked me for my opinion.

(Participant observation. Adult male from China, participant in a sustainable cities project)
We are very lucky that we live in New Zealand, which is renowned for its environment conservation. Chinese in Auckland are especially lucky to have the Department of Conservation to help to set up a "Chinese Conservation Education Trust". Through activities we can learn about conservation. Though we can enjoy clean fresh air and nice living environment here in New Zealand, we understand that any environmental pollution happening anywhere in our Global Village, sooner or later will affect us.

(Chinese conservation education trust: www.ccet.org.nz)
Learning from China

Learning from China

• China provides examples of incentive schemes. Shanghai is subsidising the installation of 100,000 roof top solar panels.

• Perhaps China can teach the developed world how to behave in a more sustainable manner?
  (participant observation: Travelling Researcher)

Dongtan

“Red China going Green with Eco-city”

“Land of hope in Industrial Stream”

(http://www.nzherald.co.nz/section/2/story.cfm?c_id=2&objectid=10380293)
land of hope in industrial stream

Zealand project at the mouth of the River is the world's biggest single rent: an eco-city for millions of that could provide a blueprint for mining. Frank Kane reports

In the land of hope in developing countries, there are examples of the world's largest and most successful urban development projects. These projects include the use of green building techniques, renewable energy sources, and sustainable urban development practices. The project at the mouth of the River is one of the largest and most successful of these projects. The project is designed to provide a blueprint for mining.

"Donglan is the best hope we have for producing a sustainable urban way of life." - John Howard, director of engineering and environmental studies.

The project will be based in Auckland, New Zealand. It will be developed by the New Zealand government and will be a model for sustainable urban development in the country. The project will focus on the integration of green building techniques, renewable energy sources, and sustainable urban development practices. It will be designed to provide a blueprint for mining.

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Summary

• LIUDD research programme designed to build understanding across the social, economic, technical, biophysical areas of research and practice

• Supporting integrated, adaptive management of devices, lots, subdivisions and catchments

• Building knowledge and experience within the development industry of alternative urban development approaches