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**Title of Paper:** **Shifting With the Times: The Emergence of Low Impact Approaches To Building Sustainable Communities**

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**Abstract**

The challenges facing society from climate change and other global pressures require us to make fundamental shifts in the way that we manage urban development. While the drivers for change often come from a global perspective, how we decide to manage that change is something that needs to be done locally. One of the tools available to manage the effects of change and the shift to more sustainable practice is low impact urban design and development (LIUDD). It is increasingly being promoted as an alternative and more sustainable approach to conventional urban development practice.

While many of the ideas for LIUDD come from overseas experience, it is being increasingly implemented in New Zealand as a means to manage the negative impacts of urban development. However the practice of LIUDD is often ahead of policy. A common barrier to changing practice is seen as the clash between the policies, plans and codes of practice, and the reluctance of some professions to embrace LIUDD as a tool to deliver more sustainable communities.

The LIUDD research programme, run by Landcare Research and the University of Auckland, and funded by the Foundation of Research Science and Technology, has been exploring the processes of change as they relate to shifting policy and practice to more sustainable approaches to urban development. This work has looked at how to develop a more supportive policy framework and how to build the capacity of practitioners and organisations to take on board new approaches.

This paper will discuss the findings of a recent review of international best practice in terms of policy mechanisms to promote the uptake of low impact approaches, how this knowledge can inform the development and strengthening of policy in New Zealand, and the processes that can be used to challenge the status quo and shift practice.

## **The Changing Times**

An increasing number of global pressures including climate change, peak oil, pollution, deforestation, drought and food security are forcing us to make fundamental shifts in the way we plan for and deliver urban development. The Stern Review (Stern, 2007) highlighted just how critical the implications of climate change could be for the global economy and stressed the far reaching consequences this could have for people and places into the future. These global challenges combined with local trends such as high population growth are forcing us to reconsider how we might accommodate people, provide resilient infrastructure, manage the impacts of urban activities on natural systems, enable prosperity and provide for quality of life.

Towns and cities can provide enormous opportunities for growth, vitality and development, however the concentration people and economic activity can lead to the erosion of social fabric and environmental degradation (Hague, et al., 2006). New Zealand is no exception to this with urban development adversely affecting the quality of our natural environment such as receiving waters, putting pressure on the availability of natural resources such as clean, fresh water (Ministry for the Environment, 2007) and compromising the quality of our built environments (Ministry for the Environment, 2006).

New Zealand is one of the most urbanised countries in the world with over 85% of New Zealanders now living in towns and cities (Department of Prime Minister and Cabinet, 2003). The quality of life and quality of environment are critically important to people living in these locations, and local governments has been mandated by the Local Government Act 2002 to deliver sustainable development to their communities. Current patterns of urban growth and development will not meet the future needs of those living and visiting towns and cities. A more sustainable approach to the way we plan and develop our cities and towns is needed to support the evolution of sustainable communities.

This paper will discuss the findings of a review of international best practice in terms of policy mechanisms to promote the uptake of low impact approaches to urban development, how this knowledge can inform the strengthening of policy in New Zealand to support sustainable communities and the processes that can be used to support change and shift practice. The paper concludes with some reflections on changes and shifts that are already happening in terms of the policy environment in New Zealand.

## **The Contribution Of Low Impact Approaches To More Sustainable Urban Development**

Given a mandate to deliver sustainable development to their communities, local government are seeking methods to support the translation of the concept of sustainability into practice at a local scale. Low impact urban design and development (LIUDD) is one

tool to help local government and others manage the effects of change on communities and to support the shift to more sustainable approaches to urban development.

The policy mechanisms work (Puddephatt and Heslop, 2007) that has provided the content for much of this paper was done for the LIUDD research programme. The programme is a six-year (2003-2006) nationwide research and implementation programme funded by the New Zealand Foundation of Research, Science and Technology. Landcare Research, a crown research agency, is the lead provider while other institutions (such as the University of Auckland and private consultants) are involved as subcontractors. The purpose of the programme is to facilitate the uptake of low impact design policies and practices.

LIUDD is both a design approach and a range of structural techniques that can be applied to urban development and stormwater management across a range of spatial scales and geographic locations. The design approach aims to understand the local context and work with natural resources to achieve multiple outcomes which could include infrastructure provision, habitat creation and biodiversity, landscaping and amenity, traffic calming and quality design. Structural techniques are designed in a manner that is appropriate to local conditions, meets the specified design objectives and contributes to the quality of the urban environment.

LIUDD challenges the conventional approach to urban development that is often based on singular outcomes. Creating sustainable towns and cities, and sustainable communities requires the integration of a range of professional skills including engineers, planners, designers and landscape architects to name a few. LIUDD provides an integrating framework that encourages collaboration across professions to accommodate growth, develop land, provide resilient infrastructure and better manage the interaction between the natural and built environments to achieve quality outcomes for cities and towns.

The principles and practices of LIUDD are not new and have been evolving over the past 25 years. The understanding of the benefits LIUDD can provide in adding value to the urban development process has also evolved along with practice. However, LIUDD has only received limited consideration in mainstream planning and implementation of land development activities in New Zealand. Widespread implementation of LIUDD is hindered by a range of impediments including limited experience or confidence in the approach, limited technical understanding, little or no encouragement in regulatory and policy frameworks and insufficient capacity in government and industry to support implementation (Dempsey and Dixon 2005). Similar challenges have faced the uptake of WSUD in Australia (Brown, 2004; Chandler 2005). Given that other countries, such as Australia and the United States, are arguably more advanced in the implementation of low impact approaches, the LIUDD research programme commissioned some work looking at the range of policy mechanisms that have been used internationally to promote the uptake of more sustainable approaches to urban development.

## **Policy Mechanisms To Promote The Uptake Of LIUDD: A Review Of International Practice**

There is a wide range of policy mechanisms used internationally that could assist practitioners in New Zealand in promoting the uptake of LIUDD. Mechanisms can be viewed on a scale of voluntary approaches that encourage practice through to mandated legislative requirements described in regulation. In many cases examined as part of the research, LIUDD approaches were introduced initially as voluntary for private developments and mandatory for public agencies. This recognises the role that the public sector can play in demonstrating leadership, making a commitment to new initiatives and supporting the development of LIUDD capacity for government, the development industry and the community.

The selection and adoption of a policy approach is dependent on the drivers behind its adoption and the local context within which it is applied. Key drivers are often linked to high level legislative requirements, which have been developed in response to an increased understanding of global issues, local impacts of urban development and the need to provide for more sustainable communities. A mix of policy instruments, supported by a range of tools and capacity building initiatives, are required to enable the successful implementation of a policy approach and the tangible realisation of policy objectives.

Detailed below is an overview of a range of policy instruments that have been used internationally to facilitate the uptake of LIUDD through the urban development process.

### *Design Flexibility*

Local planning provisions allow for flexibility in the design approach used to meet stormwater management requirements. This can encourage innovative site design and the integration of LIUDD as an approach to development.

### *LIUDD Stormwater Modelling Credits*

Provision of credits in the stormwater model used to determine stormwater management requirements for the development activity in order to recognise the integration of LIUDD in a development proposal. Credits acknowledge the value of sustainable design techniques and can reduce the scale of, or need for, downstream stormwater treatment systems.

### *Density Bonuses and Development Incentives*

Developers can gain approval for building heights or floor areas beyond those permitted in local planning rules by integrating LIUDD principles and techniques into development proposals. A similar incentive can be offered to encourage LIUDD by reducing development requirements such as parking and street improvements.

### *Technical Advisory Service*

The provision of technical advice can be directed at both local government agencies and the development community. Funding and technical support provided for local authorities to enhance planning requirements and supporting tools, such as infrastructure manuals and codes of practice, can promote the uptake of LIUDD. Provision of free technical advice to developers from professionals with LIUDD expertise during the design stage of a project can encourage the integration of LIUDD and support the development of quality permit (consent) applications.

### *Fast Track Permitting and Reduced Permit Fees*

Developments incorporating LIUDD principles and techniques can qualify for “fast track” permitting (consenting) processes and reduced permit (consent) fees. This can provide assurance that permit (consent) processing for LIUDD projects will take no longer than conventional stormwater management permit (consent) applications and can offer reduced costs for this approach.

### *Reduced User Fees*

Discounts in commercial and residential stormwater fees/rates can be offered as an incentive to implement LIUDD techniques on site. The range of acceptable methods can be defined by the local authority and fee/rate reductions can be scaled according to the extent to which LIUDD is implemented.

### *Stormwater Offsets and Credit Trading*

A stormwater offset or trading scheme is a market based approach that provides an economic incentive for developers to meet LIUDD or stormwater management targets. Monetary contributions are required where management standards cannot be met within a development and the funding is directed towards other stormwater management or development objectives to ensure targets are achieved on a catchment scale.

### *Financial Assistance and Capacity Building*

Programmes that providing funding, advice or support can encourage actions that reduce stormwater impacts through the implementation of LIUDD principles and techniques. These programmes often include a significant community outreach and education component and are aimed at improving skills, knowledge and expertise, as well as providing localized stormwater improvements. Examples include downspout disconnection and rain garden implementation projects, provision of funding for research and demonstration projects, interpretation signs and outreach initiatives.

### *Regulations*

Mandatory stormwater management regulations have been adopted by some government agencies, which set minimum standards that must be met by all developments. The establishment of regulations appears to follow many years of voluntary approaches to encourage the application of LID principles and techniques.

One of the key findings from the research on policy mechanisms was that policy alone is not enough to facilitate a change in the approach to urban development. The capacity of the system within which the instrument is applied has significant influence on how successful development and implementation of the approach will be.

Through investigating international examples of policy approaches to LIUDD a range of 'enabling' factors that have supported the development and implementation of LIUDD policy internationally were identified. These are fundamentally about the provision of leadership, knowledge, skills, resources, technical advice, funding and integrated processes that provide an enabling context within which new practices can evolve. Key factors are described below.

- Knowledge and understanding of LIUDD philosophies and techniques by both the development community and regulatory agencies.
- Adequate staff and resources to support new approaches and to actively seek opportunities to promote LIUDD in development.
- Passionate and visionary leaders who have made a commitment to support sustainable urban water management solutions and who advocate and empower people to take this approach.
- Interdisciplinary teams and organisational processes that enable integrated decision making in developing policies and tools, and providing advice and assessment services for innovative development applications. An integrated process can assist in achieving buy-in to an approach across a range of disciplines and audiences, avoid the development of contradictory policy objectives and support the delivery of multiple urban outcomes.
- A clear understanding of the problem that identifies LIUDD as a solution and an organisational vision and set of values that can guide decision making.
- Quality data, information and clear management objectives to provide the justification of LIUDD as a policy approach.
- Community outreach and consultation during the development of a policy approach to up-skill the community on the problem, seek their input to the proposed solutions and gain support for the adopted policy approach.
- Criteria and guidance material that provides certainty to both regulatory agencies and the development community about acceptable approaches and how these will be assessed.

- The use of clear and meaningful language that facilitates shared understanding and levels of understanding across disciplines and audiences.
- Introduction of voluntary policies with incentives for innovative performance for the private sector and mandatory requirements for the public sector to demonstrate leadership, build capacity and recognise best practice. Regulations are introduced much further down the track (5-20 years) and are likely to be better supported by an informed community and improved levels of practice.

These enabling factors provide a useful lens through which to reflect on policy and practice in New Zealand.

### **Reflections on Policy And Practice In New Zealand**

The authors of this report get a general sense that there is increased knowledge and understanding about LIUDD philosophies and techniques. This is evidenced by interest being shown by developers, councils and communities is how these approaches could be used to support the building of more sustainable communities. There is much less need to 'sell' the benefits of LIUDD, rather there is increasing demand for information on 'how to do it' – both in a policy and practice sense. With the review of many District Plans looming, policy planners are interested in discussing some of the policy mechanisms used internationally with a view to seeing how they could strengthen provisions for LIUDD in the so called 'second generation' district plans.

One council that is leading the way in terms of supporting new approaches and seeking opportunities to promote LIUDD is Kapiti Coast District Council (KCDC). Like many other government agencies, KCDC are faced with the challenge of providing essential community infrastructure to meet the needs of a rapidly growing urban population (Heslop and Guerin, 2007) in a way that will provide for sustainable communities. KCDC approached this challenge by seeking to develop an alternative design guide to the standard engineering code of practice that would promote greater innovation in the design of new subdivisions and the provision of key infrastructure, in particular water, wastewater and roading networks. A key aspect of the KCDC process was the acknowledgement that changing the code of practice would not be sufficient to change practice. There were a number of key elements that supported the shift from a conventional to more innovative approach to subdivision and urban development in Kapiti. These include seeking support for change from senior management and politicians, actively engaging and involving staff across KCDC in the development of new design guidelines, up-skilling staff involved in subdivision consent assessment, establishing a 'design and review process', working in partnership with developers and other stakeholders with an interest in the land development and making supportive changes to the District Plan. KCDC have been willing to take some risk in challenging conventional approaches to land development and facilitating a shift towards more

innovative practices that can contribute to quality of life, quality of environment and support communities into the future.

Another way in which the LIUDD research programme is contributing to the changing of policy and practice is through the fostering of networks and providing opportunities to see LIUDD in practice. The research programme has had an active National Task Force for over four years. The role of this task force is to help researchers find ways to disseminate the research findings in ways that would be useful to end-users, as well as to bring together practitioners who share a common interest in doing things differently. The task force has representatives from a number of local authorities throughout New Zealand and from the private sector. The membership of the task force has grown and evolved over time to cater to the growing interest in LIUDD as a tool to manage the impacts of urban development. Another networking opportunity was an event held in Christchurch in June 2008. The aim of the day was to bring practitioners from around New Zealand together to see the progress that Christchurch City Council had made in advancing LIUDD philosophies. While the approach taken and the drivers for change were unique to Christchurch, the ways in which they had led and supported change at both the policy and organisational levels were transferable to other practitioners.

The LIUDD research programme has also developed a case study portal that aims to profile current practice in New Zealand and to share learnings amongst practitioners. Having access to knowledge and information about how others have approached the implementation of alternative approaches to land development is a key enabling factor to improved uptake of LIUDD. The case studies profiled on the site (<http://cs.synergine.com>) are from around New Zealand and focus on a range of areas of interest from policy, to engineering to economics through to construction and maintenance. Case studies will continue to be added to the site for the remainder of the research programme and discussions are underway to find a long-term home for the site and its information.

While there is a long way to go until alternative approaches to land development become mainstreamed through policy and in practice in New Zealand, there are signs of increasing uptake.

## **Conclusion**

Responding to challenges of climate change and other global pressures is forcing us to make fundamental shifts in the way that we currently manage urban development. Local responses to global challenges are required to ensure that solutions respond to community needs and are appropriate to local conditions. LIUDD provides an integrating framework to support the shift to more sustainable approaches of urban development that provides for quality of life and quality of environment.

While New Zealand legislation provides a mandate for the sustainable development of communities, current policies, plans, design codes and regulatory processes provide little incentive for innovative and adaptive design that is required to progress sustainability goals. There is significant potential to use the experience of others to develop supportive policy frameworks and build the capacity of practitioners and organisations to take on broad new approaches such as LIUDD so they can deliver more sustainable communities.

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