BUILDING FOR SUSTAINABLE HOMES IN SUSTAINABLE NEIGHBOURHOODS

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ABSTRACT

Building sustainable homes and creating sustainable settlements through city planning, compact city patterns and urban consolidation have attracted considerable focus in recent years. Too often, however, the neighbourhood has been neglected. Yet the neighbourhood connects our homes with the city system. The location of neighbourhoods, the way in which neighbourhoods are built, the amenities they provide, the quality of the neighbourhood experience and the attachment that people have to their neighbourhood and the people that live in it are all important if our homes and our cities are to be sustainable. In this paper, we consider what makes neighbourhoods sustainable. We also explore the opportunities that neighbourhoods provide to create more sustainable behaviours within our homes, and we consider the extent to which the design and building of dwellings are responding to the demands for intensification and mixed use at the neighbourhood level in the context of urban consolidation.

INTRODUCTION

The commitment to sustainable homes is an empty one if there is not an equal commitment to sustainable neighbourhoods. Beacon Pathway, a research consortium founded in a collaboration between members of the building industry, the research sector and local government, has recognised this.

The Beacon vision that New Zealanders will live in "homes and neighbourhoods that work well into the future and don't cost the earth."

That dual focus on homes and neighbourhoods is a very real departure from the way in which the built environment has been traditionally treated in the sustainability debate. The sustainability debate has been dominated by either a preoccupation with the 'green' house or the 'green' city – usually the 'compact' city. The reality is however, irrespective of the thermal performance of a dwelling, its ability to harvest the sun or rain, the embodied energy in its materials, or its ability to use water efficiently, a dwelling can never be sustainable if the neighbourhood in which it is placed is not sustainable. Similarly, neighbourhoods cannot be sustainable without efficient, resource parsimonious but comfortable houses. Nor can neighbourhoods be sustainable without being connected and integrated into city and regional systems in an efficient way and in a way in which the neighbourhood itself contributes to rather than consumer resources.

Too often, however, the sustainability and the opportunities for resource generation, harvest, and reuse, as well as resource efficiency has been ignored in favour of macro-regional and settlement placing or micro-design of sites and dwellings. In recent years, however, a new neighbourhood focus has emerged. Not only in the context of built environment sustainability but also as a focus of social, economic and health policy. The neighbourhood effect is real. The management and optimisation of neighbourhood effects on social outcomes has prompted a renewed interest in the dynamics of neighbourhoods and the impacts of neighbourhood built environment on economic and social vibrancy, liveability and place identity. The neighbourhood is a point in which the triple bottom-line of social, economic and environmental outcomes can indeed be usefully operationalised.

Beacon's neighbourhood team was charged with developing a neighbourhood sustainability framework and tools that would allow the characteristics of sustainability in the neighbourhood

context to be articulated, measured and managed. This paper is concerned with how that task was approached. Of course, developing a neighbourhood sustainability framework immediately raises two critical problems. Firstly, how can we best define neighbourhoods, and, secondly, how can we best articulate sustainability.

DEFINING NEIGHBOURHOODS

Attempts to define neighbourhoods broadly fall into three approaches. Firstly, there are attempts to describe neighbourhoods in relation to their spatial features, in particular population and building densities, travel times to services and other proximity measures. Secondly, there are attempts to define neighbourhoods using detailed descriptions of activities that are presumed to be uniquely sited in neighbourhoods. Thirdly, there have been attempts to define neighbourhoods in relation to expectations around the nature and quality of social relations, identity and attachment presumed to be generated by neighbourhoods.

Within the context of city planning, planners concerned with neighbourhoods have tended to emphasise a spatial/activity method of neighbourhood planning or an activity/attachment method of planning neighbourhoods. The first method treats the neighbourhood as merely a place in which residents live and may be used for administrative purposes and to locate goods and services that households need to access on a frequent basis. The second method treats the neighbourhood as a place through which people generate their identity, experience their intimate secondary relations, and develop a sense of social attachment (Hall, 2002:38-42). The 'ward' in Garden City planning is an example of the former view of the neighbourhood. The neighbourhood is simply a sub-unit of the city system.

Neighbourhood boundaries are defined to ensure the proximity of a dwelling to goods and services required by members of households on a daily basis. The calibration of proximity is undertaken in relation to walking times. Rather than defining the number of dwellings and the population size of a neighbourhood, then a neighbourhoods' dwelling numbers and population size are defined by using walking times and prevailing dwelling densities and occupancy rates.

By way of contrast, neighbourhood population size is predetermined for those who see neighbourhoods as places primarily functioning as generators of identity and attachment. That position, promoted strongly by the American planner Clarence Perry in the 1920s and still hugely influential, at least implicitly, treats the neighbourhood as a means by which the alleged anonymity and alienation of urbanised industrial society can be addressed by creating urban villages within the city system, largely self-sufficient to themselves and acting as the primary site of social intercourse, relationships, identification and attachment. Because the neighbourhood is effectively about generating relationships of reciprocity, recognition and commitment, both the delimitation of the neighbourhood from the wider city system and population size are important planning tools. The delimitation of the neighbourhood is to be accomplished through the provision of primary schools, a spread of around three-quarters of a mile radius and bounding of the neighbourhood by arterial roads. The population is limited to about 1,000 families, a number that was seen as comparable to the size of rural settlements allowing both differentiation but also close social relations between families.

Sociological research into community, neighbourhoods and neighbouring has confirmed the fundamental difficulties of defining neighbourhoods in terms of intimacy, identity and attachment. Identity is formed through a variety of processes including social and economic activities, and the transactions and relationships in which they are engaged. Neither those nor the parameters of self-identification, which can include among other things ethnicity, sex, age,

kinship, occupation and class are restricted to place and are certainly not restricted to something as confined as the neighbourhood. Even in rural communities, networks, identities and attachments are multiple and overlapping and go beyond the boundaries of the community itself (Thorns, 1976; Bryson, 1972; Forrest, 2004; Gans, 1995; Kilmartin *et al.*, 1985; Young & Willmott, 1972). In urban environments the generation of identity, intimacy and attachment is similarly driven by diverse connections and relationships, some of which are place bound and some of which are not place attached at all. Neighbourhoods are not simply sites of positive interaction, the neighbourhood itself can not be defined by the 'quality' of the interactions between people. Neighbourhoods exist whether their residents are satisfied with them or not, and irrespective of the extent and nature of interaction with people living within the boundaries of a neighbourhood.

What the research and experience of over a century of city and neighbourhood planning shows is that reducing neighbourhoods to spatial measures and proximities or definitions that require a specific and unchanging range of functions or activities to be carried out within them has proved a largely futile task. Neighbourhoods are highly dynamic. The functions of and activities carried out in neighbourhoods vary from one neighbourhood to another, from city to city, from time to time, and according to the different social and economic roles of the diversity of people living in neighbourhoods. Neighbourhoods are important entities within city systems that both reflect and impact on the way in which people lead their everyday lives.

If the prescriptive expectations of neighbourhoods are stripped away, across the planning and research literature a set of key characteristics of neighbourhoods are discernable. Neighbourhoods:
▪   are spatial nodes in which households and dwellings are clustered;
▪   provide for residential functions;
▪   facilitate residential functions through a built environment that allows for the interconnection and mutual use of infrastructure and services among neighbours and neighbouring dwellings;
▪   are connecting spaces between individual dwellings and the city system;
▪   consist of the neighbours of a cluster of dwellings;
▪   consist of boundaries that are loosely defined although those boundaries will typically go beyond a household's directly adjacent neighbours;
▪   are a domain of casual social interaction; and
▪   are a key site of the routines of everyday life.

In short, neighbourhoods are definable but only in abstract terms. Neighbourhoods are marked by functional diversity, are subject to different demands by the people living in them, and are subject to change over time. Neighbourhoods change because:
▪   the people living in a neighbourhood changes, and/or because
▪   the social and economic positions residents occupy change, and/or
▪   social and economic institutions which neighbourhoods reflect change.
The history of neighbourhoods and neighbourhood renewal (both spontaneous and purposeful) shows that the social and economic life of neighbourhoods can be expected to wax and wane. Neighbourhoods can lose but also regain their attraction. As such, it is difficult to determine what will make a neighbourhood sustainable socially and economically.

SUSTAINABILITY: NEIGHBOURHOODS THAT 'WORK'

By 'neighbourhoods that work', we mean neighbourhoods that have shown a high degree of social and economic adaptability and vibrancy over time, that generate satisfaction, attachment and a sense of place among those that live in them, and neighbourhoods that can display civic

leadership, purpose, and ability to mobilise around issues that are of concern to it. Internationally, there is in social science research a long heritage related to place, locality and neighbourhoods. Some of that research has been directly connected to exploring the preoccupations of planners. Neighbourhood research has emerged out of concern with the social dynamics of small groups. Other research still has emerged out of concerns about the way in which inequalities and/or separations associated with ethnicity, class and gender roles express themselves in space and in urban fabric as well as in differences in what researchers and policy makers have variously referred to as life chances, 'quality of life', and "well-being" (Thorns, 1976; Bryson, 1972; Forrest, 2004; Gans, 1995; Kilmartin *et al.*, 1985; Young & Willmott, 1972).

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- housing satisfaction
- an acceptable physical appearance of the neighbourhood including low levels of dilapidation
- safety in the street both from traffic and other people
- low noise disturbance
- access to facilities and services
- access to other sites in the settlement system
- manageable cost of both residence in the neighbourhood and in connecting to other parts of the city system
- ability to have pleasant, friendly and non-threatening casual social relations
- ability to provide opportunities for neighbourhood action on local issues.

The research shows that neighbourhood satisfaction is very important. Dissatisfaction with one's dwelling and neighbourhood are prime drivers of neighbourhood exit (Michelson, 1966; Parkes and Kearns, 2003; Parkes *et al.*, 2002). Neighbourhood exit and disinvestment are critical elements of neighbourhood decline and a vicious cycle of dilapidation and negative neighbourhood effects (Terry and Joseph, 1998; Stewart, 2003a; Stewart, 2003b; DETR, 2003; DETR, 1998; Green *et al.*, 2005). Neighbourhoods with high social satisfaction also exhibit a significant degree of homogeneity. Social mix in relation to class and ethnicity has been shown not, in itself, to generate residential satisfaction in neighbourhoods (Thorns, 1976:60). Indeed, there are strong indications from research that people search for homogeneity in their neighbourhoods (Fowler, 1992:187; Kilmartin *et al.*, 1985:102-103; Thorns, 1976: 56-58; Young and Willmott, 1957; Fowler, 1992:139-177; Calaita *et al.*, 2005: 43-44).

Built environments and policy and planning settings that allow for the development of a mosaic of neighbourhoods can generate a sense of belonging and reduce social tensions while optimising interactions (Fowler, 1995: 130). However, neighbourhood differentiation needs to be supported by a built environment that not only allows for but constructs, opportunities for seamless movement from one distinct neighbourhood to another and shared spaces in which different social groups meet, interact and engage with each other (Young, 1995:266).

While there is broad alignment between city planners and policy makers on issues such as dilapidation and connectivity, the apparent desire for neighbourhood homogeneity evident among many social groups (particularly socio-economic and ethnic groups and in some countries such as New Zealand, some age groups) is less well aligned to some policy makers and planners who promote social mix. In particular there is a concern among planners and policy makers that social homogeneity generates social exclusion, is antithetical to mixed use, generates large areas of

homogenous housing which is inflexible as well as concentrates populations that are seen as problematic such as public housing tenants.

Those anxieties reflect a simplistic view of social mix and a fundamental misunderstanding of the scale of neighbourhoods. Neighbourhoods are small, locality units, but often large area units or suburbs are confused with neighbourhoods. Where homogeneity is generated in those larger units whether they be in Otara, or the new Flatbush or the new Hobsonville, very real problems of sustainability and adaptability can arise. But the Otaras of this world are, and the new Flatbush and the new Hobsonville will be, constituted from a series of neighbourhoods. Diversity or social mix in those neighbourhoods can not be reduced to crude measures of multiple tenures or ethnicities or class position.

Even in apparently homogenous neighbourhoods, there is a diversity of social and economic positions of the people who live within the neighbourhood. People use neighbourhoods differently according to their social and economic roles, responsibilities and obligations as well as according to their resources, capabilities and tastes. Even neighbourhoods that appear socially homogenous are in fact accommodating households with members who have very different responsibilities and obligations and may be at very different life stages. The experience of and use to which a child puts the neighbourhood is different from the experience, use and tastes of an adolescent. The experience of the neighbourhood varies for parents who are in paid work and those parents who are not. Equally, the experience of and the use to which the neighbourhood is put for people confronting economic constraints or constraints on mobility is likely to be different from those who are without those constraints. Whether a neighbourhood provides conditions that are perceived by residents with diverse needs, roles and obligations as liveable, will depend on the extent to which the neighbourhood allows for that diversity of use, it is not adequately measured by the concentration or lack of concentration of ascribed characteristics.

There is a significant body of research that suggests that the built environment is one a critical determinant of neighbourhood satisfaction and the well-being of the people who live within the neighbourhood (Forrest, 2004; Fowler, 1995). Moreover, it has been the repeated experience in neighbourhood renewal initiatives that reworking the built environment has been a critical platform for re-vitalising neighbourhoods and neighbourhood relationships and interactions (Centre for Urban and Regional Studies, 2004; Combined European Bureau for Social Development, 1999). The built environment is a strong factor in resident satisfaction with their neighbourhood.

The critical factors in the built environment in relation to the quality and intensity of interaction are dwelling density, public space; land use mix and diverse accommodation. Key research evidence (Appleyard, 1981) suggests that:
▪ Both low density and high density reduce the opportunities for satisfactory interactions within neighbourhoods. Interactions and friendliness are optimised with higher densities combined with accessible, policed but unregulated, and flexible public open space (Fowler, 1995; Michelson, 1966; Michelson, 1968; Michelson 1976; Young and Willmott, 1972; Thoms, 1976).
▪ In high density areas, increased land use mix is associated with increased interaction in the neighbourhood where walkability prevails. High diversity areas characterised by mixed building use, short blocks, and diverse facilities and services including commercial activities, show people are more likely to undertake daily routines within the neighbourhood. The density of services and facilities in which people can meet fortuitously but regularly and predictably are critical determinants of interaction and a sense of belonging (Michelson, 1976:67-69; Bryson *et al*., 1972).

- Areas with diverse housing that serves the needs of residents at different life stages tend to generate more flexible neighbourhoods, which respond to diverse needs.[1]

Nevertheless, it must be recognised that even with an optimally designed built environment, the neighbourhood built environment, indeed, the neighbourhood as a whole, has its limits in relation to the servicing of needs. The neighbourhood can never be more than a partial community (Thorns, 1976: 60). Consequently, the transport connections between neighbourhoods and the rest of the city system are critical. So too is the sense of the neighbourhood as an entity of, as well as within, the city. Successful integration appears to be facilitated where:

- Firstly, the transport infrastructure is designed and built in such a way as to preserve the amenity of neighbourhoods. That is, the neighbourhood has not become merely a site for the feeding of the transport system to other parts of the city system.
- Secondly, neighbourhood integration with the city system appears to be optimised where transport connections between neighbourhoods and other parts of the city system allow people both choice and tailoring of transport options.
- Finally, neighbourhood integration with the city system appears to be optimised where the built environment of the city provides for neighbourhood differentiation while allowing seamless movement from one distinct neighbourhood or sector to another (Young, 1995: 266).

## THE NEIGHBOURHOOD SUSTAINABILITY FRAMEWORK (NSF)

Addressing and aligning environmental as well as social and economic sustainability is one of the most elusive aspirations of planners and all those concerned with the building and management of cities. It is an aspiration that has proved difficult to achieve. The barriers to effective integration are only in part deficits in the knowledge platform relating to the impacts of the built environment and deficits in the technologies, techniques and systems that might mitigate those impacts. In part, however, integration has been hampered by an on-going struggle between environmentalists and built environment practitioners on one hand and social scientists, social advocates and economic interests on the other. The latter have been particularly critical of a tendency for primacy to be given to environmental outcomes irrespective of social and economic costs. Equally, there has been a reaction to the demonstrably untenable built environment determinism long evident among some engineers, urban designers and architects.

Despite those anxieties, there does seem to be good argument to undertake the sustainability analysis of the built environment of neighbourhoods as a sequential process by first establishing built environment options in relation to environmental performance. Those options need to be successively and iteratively considered in relation to social and economic sustainability. Such an approach recognises the considerable adaptability, diversity and dynamism of social and economic relationships and the diverse uses to which neighbourhood built environments are put. It also recognises the complexity of different values, interests and tastes associated with different social groups. Environmental impacts are clearly of importance to people. The quality of the built environment and the environmental performance of neighbourhoods are also an aspect of neighbourhood satisfaction. The acceptability of different environmental performance options, however, require both informed and on-going negotiation and renegotiation of built environment

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[1] Notably social mix in relation to class and ethnicity does not generate residential satisfaction in neighbourhoods (Thorns, 1976:60).

design and management choices if neighbourhoods are to be liveable.[2] The developed NSF recognises that neighbourhoods are dynamic, unique in their development histories, their built environments, their population and their geographical and socio-economic positioning within the broader settlement. Sustainability is constructed around a goal and supported by six critical domains and three built environment element were identified as underpinning neighbourhood sustainability (Figure 1):

Figure 1: The Beacon Built Environment Neighbourhood Sustainability Framework (NSF)

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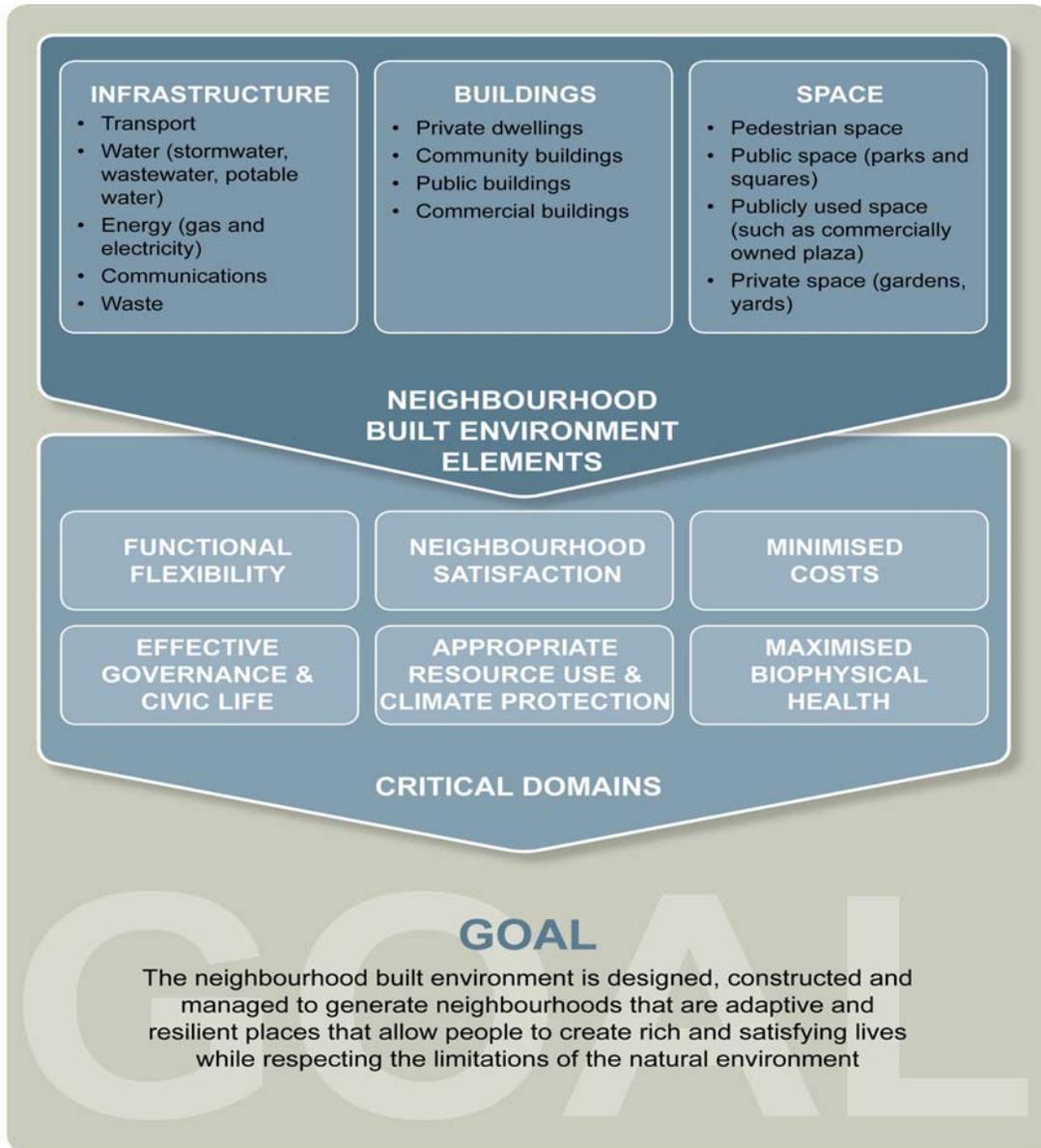
[2] The issue of the built environment/management nexus is outside the focus of this paper. It is, however, a critical pathway for the sustainability of neighbourhoods including the redevelopment and retrofit of neighbourhoods.

Table 1 sets out the critical definitions and terms that are used to specify Beacon's Neighbourhood Sustainability Framework.
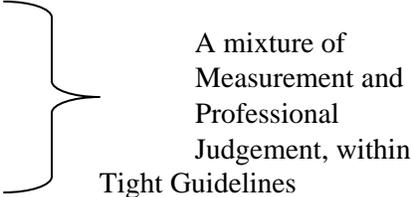
Table 1 Definitions and descriptions of terms used in the NSF

Application Scale	Neighbourhood	Spatial nodes in which households and dwellings are clustered. Provide for residential functions and may facilitate non-residential functions through a built environment that allows for the interconnection and mutual use of infrastructure and services among neighbours and neighbouring dwellings. Connecting spaces between individual dwellings and the city system. Consist of the neighbours of a cluster of dwellings. Consist of boundaries that are loosely defined although those boundaries will typically go beyond a household's directly adjacent neighbours. Arenas of casual interaction. Key site of the routines of everyday life.
Critical Outcome Domains for Neighbourhood Built Environment	Functional Flexibility	The built environment can be continuously adapted to the needs of diverse and changing populations, social, economic and environment conditions: ♦ adaptability to changes in household structure ♦ adaptability to changes in transport costs and choices ♦ adaptability to changing ethnic and socio-economic mix of the population ♦ adaptability to the effects of climate change
	Neighbourhood Satisfaction	The built environment maximises the key determinants of neighbourhood satisfaction: ▪ housing quality ▪ durability and low levels of dilapidation ▪ street safety ▪ low noise disturbance ▪ opportunities for casual social interaction ▪ opportunities for enclave living.
	Minimised Costs	The built environment minimises the direct and indirect costs and cost uncertainty for households and cities associated with: ▪ travel ▪ dwelling and section provision, maintenance and repair ▪ infrastructure provision, maintenance and repair ▪ facility provision, maintenance and repair.
	Effective Governance and Civic Life	The built environment encourages: ▪ casual social interaction at street level ▪ access to neighbourhood and city wide facilities and amenities ▪ equitable access to basic services and amenities for children and adults with diverse levels of mobility within the neighbourhoods ▪ formal interaction and spaces for formal interactions for neighbourhood governance, civic participation and government.
	Appropriate Resource Use and Climate Protection	The neighbourhood built environment encourages resource efficiency, resource conservation and the use of more sustainable resources in relation to: ▪ maximisation of dwelling performance ▪ land consumption ▪ transport energy consumption ▪ energy and other resource sources ▪ sustainable and renewable sources of energy, potable water and materials. ▪ lifecycle impacts
	Maximised Bio-physical Health	The neighbourhood built environment is designed to protect and enhance the biosphere, with particular focus on: reducing negative impacts on air quality; ensuring aquatic health; protecting/enhancing biodiversity and soil quality
Neighbourhood Built Environment Elements	Infrastructure	The fixed physical elements associated with shared services, including water infrastructure (wastewater, stormwater and potable water), transport infrastructure (roads, footpaths, cycleways, public transport), energy infrastructure (gas and electricity), communications infrastructure (phone, cable TV, etc) and waste infrastructure (e.g. recycling depot)
	Buildings	Neighbourhood buildings include private dwellings, community buildings (such as schools or a community house), public buildings (such as libraries or a town hall) and commercial buildings. Some private buildings have a public use, such as cafes, bars or the foyer of an office building or apartment complex.
	Space	Space is the area not covered by buildings or infrastructure. It includes private space (such as gardens), public space (such as parks and squares) and publicly used private space (such as a privately owned square in a shopping complex).

The NSF is supported by the Neighbourhood Built Environment Observational Assessment Tool and a Resident Self-Report tool. The aim of the tools is to aid decision making when new neighbourhoods are developed or when existing neighbourhoods are retrofitted.

The Neighbourhood Built Environment Observational Assessment consists of a number of credits against which the neighbourhood is assessed. There are two distinctly different types of credits: Credits which can be measured, such as the density of the development of the percentage of dwellings within a certain distance of a bus stop. And credits which require professional judgement, such as whether there is good surveillance of a public space.

The data from a series of case studies let us identify the key drivers of built environment sustainability at the neighbourhood level. While there are clearly many issues that affect neighbourhood sustainability our tool needed to be simple to use and is therefore limited to these key drivers:

- Walking Access to Every Day Basic Facilities
- Access to Public Transport
- Efficient Use of Space and Viability of Local Centres   Measured Credits
- Protection and Enhancement of the Natural Environment
- Dwelling Sustainability
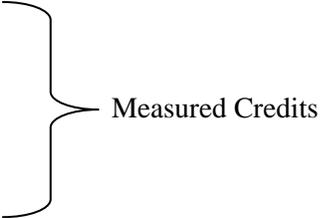
- Quality of Space
- Diversity and Resilience   A mixture of
- Appropriate Street Network   Measurement and
- Innovation   Professional Judgement, within Tight Guidelines

The Resident Self Report Tool consists of a questionnaire for residents. This questionnaire can either be mailed, hand delivered or interviews could be conducted face to face. It accesses key drivers of neighbourhood sustainability that while relating to and influenced by the built environment can not be assessed by looking at the built environment. The data collected from the case studies during the testing of the NSF was extremely useful and provided empirical evidence that the built environment influences residents perceptions and behaviour, and that more sustainable built environments lead to more sustainable neighbourhoods overall. It also highlighted where sustainability gains could be made by improving the built environment and where community management solutions are likely to be more effective. The Resident Perception Assessment covers:

- Resident satisfaction within their neighbourhood
- Resident travel habits
- Residents' use of local facilities
- Residents' participation in their community
- Residents' resource consumption
- Residents' relationship to the natural environment

Application of those tools has shown them able to provide clear indications of neighbourhood strength and weaknesses and guidance on how to address the identified weaknesses. Integrating resident behaviour and perceptions with build environment observation allows the user to judge if

problems are best addressed by built environment interventions or if other community based solutions are needed. The tools encourage a multi agency approach to neighbourhood development and management.

Beacon's goal for every new subdivision and any redeveloped subdivision or neighbourhood from 2008 onwards to be developed with reference to a nationally recognised sustainability framework is clearly ambitious. For this to happen the NSF has to be supported by a practical tool that makes its use easy and worthwhile for stakeholders.

At the local government level the research team hopes that these tools will make decision making easier for planners, rather than adding more work to a profession clearly already stretched to the limit. At central government level Beacon hopes to encourage policy makers to reference the NSF, possibly the outcome of seeing it embedded in regulation. Developers and their planners should find the tool useful in achieving better outcomes through better interpretation of information.

Neighbourhood retrofit situations are of particular interest to Beacon. This is because most of our neighbourhoods already exist and because it is often difficult to assess how the best address problems in existing areas. By highlighting the strength and weaknesses of the neighbourhood and by considering resident perception and behaviour, the NSF and its tools can help prioritise practical actions and stimulate dialogue among the various agencies involved in neighbourhoods.

NEIGHBOURHOODS AS GENERATORS OF EFFICENCY

Beacon's concern with neighbourhoods has, to date, been focussed on assessing the built environment of new and existing neighbourhoods. It is now turning its attention to the way in which neighbourhood level interventions may be able to increase the resource efficiency of households and cities. That is, the way in which neighbourhoods can act as pathways to sustainability.

In relation to sustainable city systems and regions the neighbourhood built environment and quality of neighbourhoods are going to be critical to achieving higher densities. At the household level, neighbourhood based interventions present very real opportunities to stimulate the take-up of retrofit. Well planned, attractive neighbourhoods also stimulate awareness and promote the desirability of sustainable design and construction.

Neighbourhoods present opportunities for distributed reticulation systems – whether for energy or water. It is the redesign and renewal of neighbourhoods that will encourage all of us to improve our storm water management, improve connectivity, and promote mixed use.

CONCLUSION

The Beacon Neighbourhood Sustainability Framework (NSF) has been prompted by both the importance of neighbourhoods in people's everyday lives, and the very real impacts that neighbourhood built environments have simultaneously or the resource efficiency, the environmental performance, and the social and economic outcomes of cities and households. Neighbourhoods present real opportunities for achieving not only liveable cities but resource abundant (not sure that abundant is appropriate, maybe resource responsible households or sustainable households?) households. For Beacon, with its search for a sustainable and liveable built environment, the NSF supports its work on defining what it terms a High Standard of Sustainability at the point of the dwelling. In turn, Beacon's research into sustainable homes including the development of the NOW Home® and its retrofit packages for existing homes

underpins the importance of drawing all elements of the built environment from dwelling, through neighbourhood, through settlement to region into a paradigm of sustainability and liveability.

ACKNOWLEDGEMENTS

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