

Eco-Health: Ecosystem Benefits of Greenspace for Health

Authors: Mark Scott, Mick Lennon, Owen Douglas and Craig Bullock



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ENVIRONMENTAL PROTECTION AGENCY

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EPA Research Report

Prepared for the Environmental Protection Agency

by

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Executive Summary

Introduction

This report seeks to examine environment and health relationships through investigating the potential of *green space* as a health-promoting environment. The report presents the findings and recommendations of the Environmental Protection Agency (EPA)/Health Service Executive (HSE)-funded project, *Eco-Health: Ecosystem Benefits of Green Space for Health*, which was completed in September 2018. The project and this final project report advance the perspective that accessible and well-designed green spaces are *essential infrastructure* that is fundamental to the health and well-being of thriving and inclusive communities.

Health Benefits of Green Spaces and Green Infrastructure

Chapters 1 and 2 identify the key health services provided by green spaces and green infrastructure. There is a scientific consensus that green space provides benefits for enhancing health and well-being and, moreover, these benefits and the multifunctional services provided by green space are increasingly recognised in policy at international, national and local levels. In summary, well-designed and accessible green space:

- Promotes physical activity through creating spaces for play, recreation, walking and cycling within a safe environment.
- Enhances mental well-being through creating urban refuges (from busy streets, traffic, noise) and providing a restorative environment through increased contact with nature.
- Enhances social interaction by providing opportunities for social contact, public places and community-building activities.
- Reduces environmental risks from pollution by mitigating air pollution and noise pollution through urban greening.
- Mitigates environmental risks from extreme weather through countering the urban heat island effect and acting as a “sponge” within the context of extreme rainfall or surface flooding. Both warmer and wetter weather are anticipated

as likely climate change impacts in Ireland; thus, future proofing Irish urban areas against further risks is crucial.

A life-course analysis of green space health benefits is reported in Chapter 2, which suggests that green space design and provision should be underpinned by an inclusive and evidence-informed approach that understands in greater detail the health “services” that different types of green spaces provide and also how these relate to diverse “user” needs across different cohorts. This suggests that enhancing green spaces as health-promoting environments requires consideration to be given not only to the proximity and accessibility of green space, but also to the specific design attributes that afford different groups of people opportunities for healthy activities and how people’s needs vary over their life course.

Policy Drivers

Chapter 3 highlights the policy context that supports future investment in green spaces as key to enhancing urban and rural liveability and providing health-promoting environments. From a health perspective, public health policy has increasingly shifted from a health services focus and treating ill health towards a “whole-systems approach” to health and well-being. This approach recognises that positive health outcomes not only are determined by inherited individual characteristics, but also are influenced by contextual factors, including the social and environmental determinants of health, which in turn can reinforce health inequalities. Within this context, Ireland’s framework for health and well-being, *Healthy Ireland* (Government of Ireland, 2013), emphasises a “health in all policies approach”.

From the perspective of sustainable development and spatial planning, the concept of healthy places is increasingly espoused internationally and nationally. By enhancing the provision and design of green spaces, local authorities and public agencies can contribute towards:

- the United Nations Sustainable Development Goals (SDGs), specifically implementing SDG 11:

Sustainable cities and communities, and targets relating to increasing green space access as a key goal for enhancing the liveability and sustainability of the places where we live;

- Habitat III, the United Nations' New Urban Agenda, which specifically highlights the importance of the creation and maintenance of well-connected and well-distributed networks of green spaces to improve physical and mental health;
- the National Planning Framework (NPF) – promoting green space as a health-promoting environment through a green infrastructure approach is aligned with key objectives within the NPF, particularly relating to “healthy communities” (NPF section 6.2) and environment and sustainability objectives (NPF Chapter 9).

However, although such policy guidance clearly supports an emphasis on green space provision for population health and well-being, it does not provide detailed guidance for planning and design policy in terms of the specific attributes required to tackle lifestyle illnesses in multiple cohorts.

Key Research Findings

Chapters 5–7 suggest that effective green space policy and planning is not simply a matter of “proximity” or distribution but also is about design attributes – therefore, effective policy should explore adapting existing green spaces to maximise health benefits alongside the design of new health-promoting environments. For example, the local case study analysis suggested that the presence of green space does not always result in a shift in behaviour or its greater use as a health-promoting environment. Poorly designed green spaces may prioritise one potential group over another, thereby limiting their potential use. Similarly, poor access and limited walkways/cycleways connecting green spaces with residential areas can negatively impact on perceptions and use of local green spaces. Therefore, in enhancing green spaces as health-promoting environments, consideration must be given not only to the quantity and distribution of green spaces, but also to how different cohorts or groups in society can potentially benefit from green space and how existing green spaces can become more multifunctional and inclusive. Chapter 7 presents a method for citizen engagement to inform the design

process that maximises health benefits from green space interventions.

Design Principles for Green Space

Based on the research findings, key design principles include:

- *Accessible* spaces with good links (pedestrian and cycleways) to nearby neighbourhoods.
- *A networked approach*: emphasising *green infrastructure* networks (rather than isolated parks) can provide opportunities for connecting existing and new green spaces and creating new linkages between urban and rural areas.
- *Inclusive in design*, catering for local needs from young to old and all physical abilities. Green spaces that are designed to support very specific functions tend to attract limited groups of users.
- *Well managed and maintained*, creating a high-quality environment: poorly managed spaces or vandalism prompt negative perceptions among potential users.
- *Multifunctional* uses: examples include spaces that encourage active mobility, physical activity and sports, relaxation and tranquillity, and opportunities for social exchange (e.g. incorporate community gardens, encourage parkruns).
- Enhance urban greening through *planting strategies* that mitigate noise and air pollution and maximise local biodiversity gain and facilitate sustainable drainage (e.g. deciduous wooded and wildflower meadow areas).
- Create multisensory restorative environments that help mitigate the psychological stresses of modern living through the provision of “restive places for rejuvenation”.

Recommendations

Chapter 8 outlines a series of 24 Eco-Health project recommendations under six headings for enhancing the design of green spaces for health benefits. Key priorities are:

1. *Framing green spaces as a public health investment*: essential to delivering high-quality and liveable places, future proofing settlements for anticipated climate change risks, and delivering on Ireland's SDG commitments.

2. *Enhancing institutional and governance arrangements*, including mainstreaming the Healthy Cities and Counties approach; integrating health objectives into local authority development plans; and aligning Health Impact Assessments with Strategic Environmental Assessments to assess health and well-being impacts of development.
3. *Enhance green space within local authority statutory planning*, through advancing green infrastructure approaches across urban, suburban and rural areas; baselining green space assets and identifying new green infrastructure/ green space opportunities; and giving greater consideration to the health services provided by multifunctional green spaces.
4. *Designing green spaces for health*: maximising health benefits should be central to the design and retrofit of green spaces. Design interventions should be inclusive of the needs of different age, social and cultural groups and should be evidence informed.
5. *Co-design of green spaces*: mobilise local knowledge into local solutions through developing innovative community engagement methods for design.
6. *Capacity-building requirements*: develop tailored continuing professional development training, building local government senior management buy-in and mainstreaming green infrastructure and health into planning education.

1 Introduction

1.1 Research Context

This report seeks to examine environment and health relationships through investigating the potential of *green space* as a health-promoting environment. The report presents the findings and recommendations of the Environmental Protection Agency (EPA)/Health Service Executive (HSE)-funded project, Eco-Health: Ecosystem Benefits of Green Space for Health, which was completed in September 2018. The project and this final project report advance the perspective that accessible and well-designed green spaces are *essential infrastructure* that is fundamental to the health and well-being of thriving and inclusive communities. In this context, we adopt a broad definition of health by going beyond a mere absence of illness and objective indicators of health to address well-being and quality of life (O'Neill and Simard, 2006), which is in line with the seminal definition of health as set out by the World Health Organization (WHO) (1946):

[H]ealth is not merely the absence of disease and infirmity but a state of optimal physical, mental and social wellbeing.

Both within the literature and within policy, green space is increasingly recognised as key to creating more sustainable and health-promoting urban environments, providing important services relating to enhancing physical activity, reducing stress, mitigating environmental stressors such as air and noise pollution, and reducing environmental risks such as urban flooding or the urban heat island effect. For example, both the recent United Nations (UN) Sustainable Development Goals (SDGs) and Habitat III (the UN's New Urban Agenda) identify the improvement of human health and well-being as a key priority urban goal. Signatories to the SDGs and Habitat III are committed to the promotion of a safe, healthy, inclusive and secure environment in cities and human settlements, including the creation and maintenance of well-connected and well-distributed networks of green spaces to improve physical and mental health and urban liveability and to enhance resilience to environmental risks.

However, although such policy guidance clearly supports an emphasis on green space provision for population health and well-being, it does not provide detailed guidance for urban policy in terms of the specific attributes required to tackle lifestyle illnesses in multiple cohorts. This report aims to address this deficit. In this context, the report aims to, first, develop a robust evidence base for policymakers, designers and green space managers in enhancing existing or providing new green spaces to maximise health benefits. Second, the report aims to translate and mobilise this evidence base into policy, planning and design tools that can be employed by those involved in developing and implementing green space policies across a range of different environment types.

1.2 Health, Well-being and the Environment

Health is a personal, social and economic good, and the health and wellbeing of individuals, and of the population as a whole, is Ireland's most valuable resource ... A healthy population is a major asset for society, and improving the health and wellbeing of the nation is a priority for the Government and the whole of society. This means that all sectors of society and the whole of Government need to be proactively involved in improving the health and wellbeing of the population (Government of Ireland, 2013, p. 6).

As the above quotation from Ireland's framework for health and well-being indicates, health policy has increasingly shifted from a narrow focus on health service provision and treating those in ill health to a "whole systems" approach to health and well-being. This approach recognises the importance of social and environmental determinants of health and well-being, which in turn necessitates a whole-of-government and whole-of-society response to embed health and well-being within a range of policy sectors. This is also referred to as a "health in all policies" (HiAP) approach.

From an environmental perspective, the link between environmental conditions and human health is now

well established in the literature, with the environment viewed as one of the key determinants of health alongside inherited characteristics, lifestyle, and social and economic variables (Barton, 2009). Indeed, over the past 10–15 years, there has been a re-emergence of interest in the impact of the environment on health in advanced economies (e.g. EEA/JRC, 2013), with a considerable expansion of theoretical and empirical studies investigating the role of contextual factors in the production and maintenance of health variations (Cummins *et al.*, 2007).¹ Although there is a longstanding recognition of the negative impacts on health of environmental “bads”, such as poor air quality and the distribution of various forms of pollution, more recently increasing attention has focused on the potential positive influence on health of environmental

“goods”, such as access to “nature”/biodiversity and the distribution of urban green space (Lake and Townshend, 2006). These wider determinants of health are illustrated in Figure 1.1.

High-level policy frameworks and guidance documents have also increasingly recognised the environmental determinants of health and well-being. For example, within Europe, the European Union’s (EU) Environment Action Programme to 2020 includes safeguarding Europe’s citizens from environment-related pressures and risks to health and well-being as one of its key priority themes. At a national level, the EPA’s Strategic Plan 2016–2020 includes “our environment, our well-being” as its key overarching goal, recognising that a thriving environment is central to healthy lives. More specifically, across the globe,

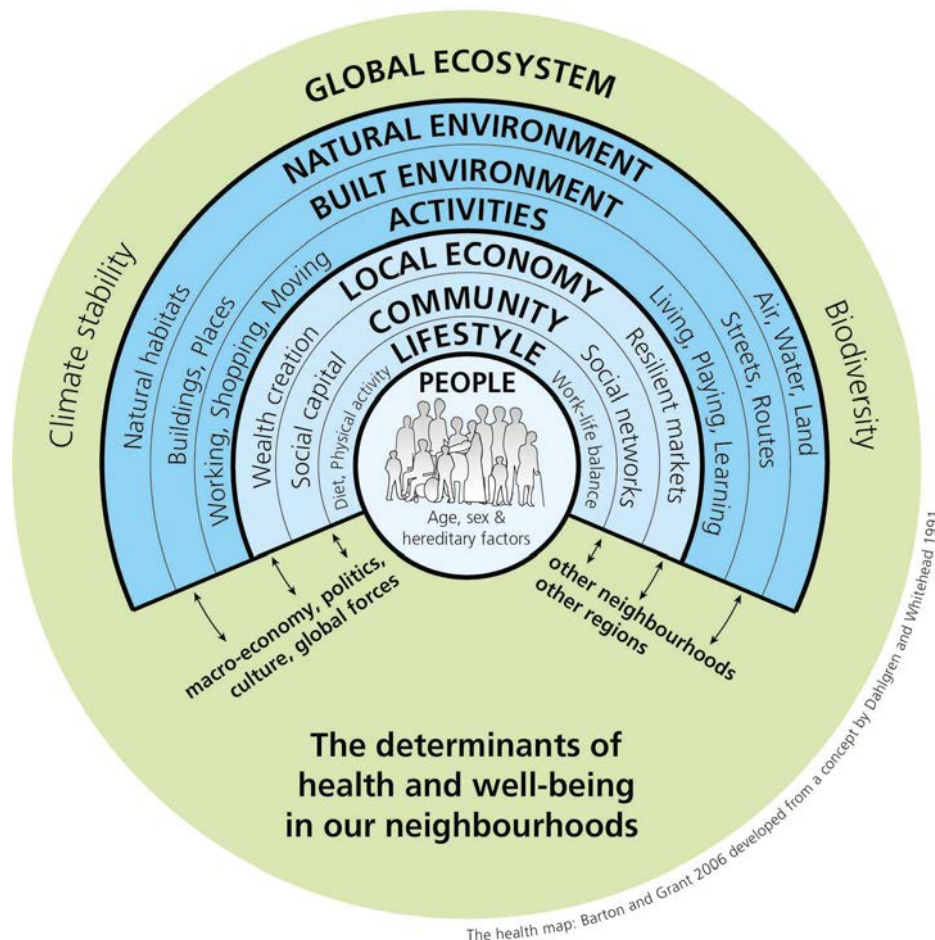


Figure 1.1. A health map illustrating the determinants of health. Reproduced with permission from Barton and Grant (2006), developed from a model by Dahlgren and Whitehead (1991).

¹ Understanding the environment as having a “contextual effect” on health implies that similar individuals will have a different health status in different types of places (whereas the “compositional effects” on health concern individual characteristics within places) (Omariba, 2010).

policymakers are increasingly exploring the links between the places where we live, environmental quality and public health as concerns rise about the impacts of urbanisation and development on health outcomes and healthy lifestyles. As observed by Barton *et al.* (2009), urbanisation trends over the last 40 years in many Western societies have fostered a car-dependent, sedentary and privatised lifestyle, characterised by growing urban sprawl and dispersed development, land use segregation and car-based developments such as out-of-town retail and office parks. These urban trends often hinder the integration of physical activity into daily routines, leading to “obesogenic environments” (Townsend and Lake, 2017), and diminish the psychological well-being arising from contact with nature. These trends are evident in Ireland, where, for many people, the benefits of economic development have come at the cost of having physical activity and options to connect with nature designed out of daily life. In the context of health and well-being determinants, increasing levels of physical inactivity, rising obesity and rising mental health issues, together with an ageing population, “if not addressed now, will lead to an unhealthy and costly future” (Department of Health, 2017, p. 1).

1.3 Green Space, Green Infrastructure and Health

This report focuses on enhancing health and well-being benefits from green spaces in both urban and rural environments. Table 1.1 provides a brief definition of key concepts underpinning our approach, including how we define health and well-being and green spaces. To further operationalise health and green space themes, the research also draws on wider concepts of ecosystem services (common in environmental policy) and green infrastructure, which has increasingly been promoted within spatial plans as a policy tool to develop strategies for multifunctional networks of green spaces and ecological networks.

The report will focus on the health benefits of ecosystem services provided by green spaces and green infrastructure networks to support health-promoting environments or “healthy places”. In summary, green space has been shown to improve air quality through the absorption of pollution by vegetation, promote informal and formal physical activity with a consequent positive effect on physical health, and help reduce stress levels and promote mental health (UK-NEA, 2011). Drawing on Walker

Table 1.1. Eco-Health definitions

Concept	Definition
Health and well-being	Health is not merely the absence of disease and infirmity but a state of optimal physical, mental and social well-being (WHO, 1946). Well-being reflects the quality of life and the various factors that can influence it over the course of a person's life (WHO, 2012). Well-being also reflects the concept of positive mental health, in which a person can realise his or her own abilities, cope with the normal stresses of life, work productively and fruitfully, and be able to make a contribution to his or her community. Consideration of health and well-being requires a shift in focus from what can go wrong in people's lives, to focusing on what makes their lives go well (Government of Ireland, 2013)
Green space	Within urban areas, public green space includes parks and reserves, sporting fields, riparian areas such as streams and riverbanks, greenways and trails, community gardens, street trees and nature conservation areas, as well as less conventional spaces such as green walls, green alleyways and cemeteries. Private green space includes private backyards, communal grounds of apartment buildings and corporate campuses (Wolch <i>et al.</i> , 2014). Within the rural environment, green spaces may be more extensive, including greenways, blueways (e.g. river corridors, coastal paths), peatways, forests/woodlands and accessible trails (e.g. rights of way). Green spaces provide essential ecosystem services and are components of green infrastructure
Ecosystem services	Broadly conceived as “the benefits people obtain from ecosystems” (MA, 2005, p. v), namely supporting services (services necessary for the production of all other ecosystem services, e.g. nutrient cycling, water cycling, soil formation); regulating services (services necessary for the regulation of all other ecosystem services, e.g. air quality regulation, climate regulation, water purification and waste treatment); provisioning services (the provision of products obtained from ecosystems, e.g. food, fibre, fuel, pharmaceuticals, fresh water); and cultural services (the non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation and aesthetic experiences, e.g. recreation and tourism, aesthetic values, sense of place, cultural heritage values)
Green infrastructure	An interconnected network of multifunctional green spaces – urban and rural – that conserves natural ecosystem values and functions, which are capable of delivering a wide range of environmental and quality of life benefits for local communities (Benedict and McMahon, 2006; Scott <i>et al.</i> , 2016)

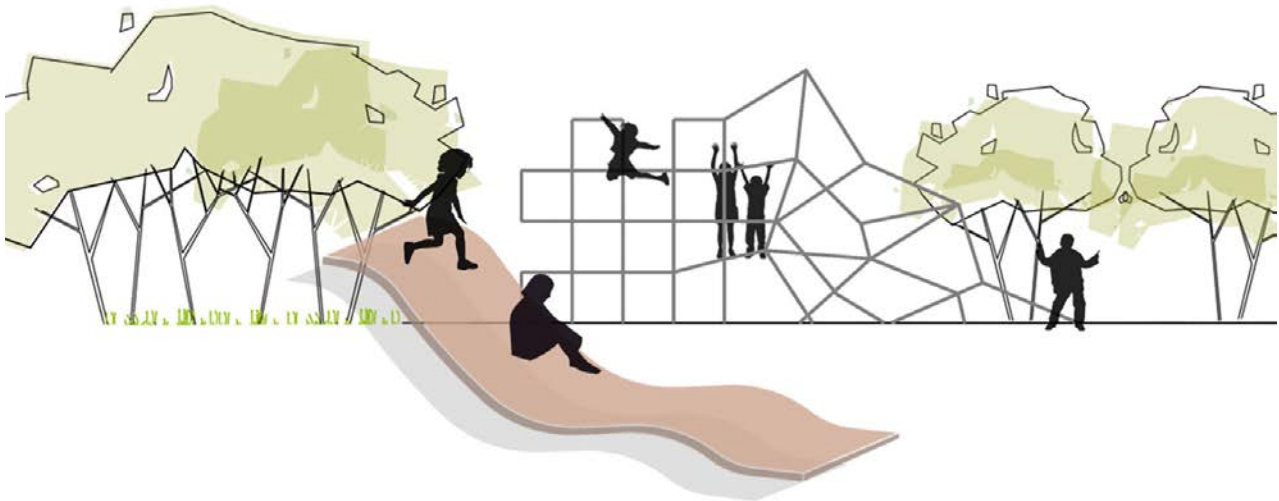
(2012), these relationships between green space, ecosystems services and health benefits can be categorised as follows:

- *Ecosystem services and physical health.* There is a growing body of evidence indicating that the ecosystem services provided by high-quality green space have a significant influence on physical health. Such ecosystem services are particularly beneficial when they are easily accessible and exist in proximity to residential areas. For example, in a significant study of 6919 people across eight European countries varying in wealth, culture and history, it was concluded that the probability of being physically active may be as much as three times greater in residential environments possessing high levels of access to green space, with the likelihood of being overweight up to 40% less (Ellaway *et al.*, 2005). Other studies substantiate these findings by demonstrating that access to green space increases the positive assessment of their neighbourhood by residents and encourages use of local green space for physical activity (Björk *et al.*, 2008; Lestan *et al.*, 2014). Furthermore, research suggests that encouraging use of green space to promote better physical health can be advanced through careful planning of linear parks that can be accessed and used by people to replace motorised transport with cycling and walking in their daily commutes (Dallat *et al.*, 2014). Such research indicates that significant savings can be made to the costs of public health provision through the conscious design of places to supply greater opportunities for physical activity. Indeed, by employing UK statistics, Mourato *et al.* (2010) calculated that a benefit from increased accessible green space provision of almost £2 billion would have accrued to the UK government in 2001 through savings in the health costs incurred of treating just three physical conditions (coronary heart disease, colorectal cancer and stroke) and reductions in morbidity from mental health.
- *Ecosystem services and mental health and well-being.* Green spaces have been shown to deliver measurable mental health benefits and contribute to general psychological well-being (Grahn and Stigsdotter, 2003; Nielsen and Hansen, 2007).

Such services are provided through supplying “restorative environments” (Kaplan and Kaplan, 1989), which perform a role in reducing stress from the complex demands of everyday life and helping people cope with depression, bereavement and mental fatigue (CABE Space, 2005). These services may be particularly important within an urban context where exposure to stresses may be more acutely perceived (van den Berg *et al.*, 2010; Beyer *et al.*, 2014). Epidemiological studies have identified positive effects of green spaces on the self-reported physical and mental health of residents (e.g. de Vries *et al.*, 2003; Guite *et al.*, 2006; Maas *et al.*, 2006; van den Berg *et al.*, 2010) and longevity (e.g. Takano *et al.*, 2002), with Guite *et al.* (2006) identifying an association between the presence of “escape facilities” such as green space and mental well-being across a range of domains.

- *Ecosystem services and mitigating other forms of environmental risk to health.* Green spaces and their associated vegetation can positively influence health through contributing to improved air and water quality. Vegetation can help remove airborne pollutants, whether in particulate or gaseous form. This is an especially pertinent issue in urban environments where traffic-related pollutants can prove detrimental to physical health and mental well-being (Michie and de Rozarieux, 2001). For example, broad-leaved woodlands can reduce ambient air pollution by 17% (Dunnett *et al.*, 2002). Carefully designed green spaces can also assist in water filtration which facilitates biodiversity, thereby enhancing well-being by assisting in the provision of greater opportunities for contact with nature (Everard *et al.*, 2012). Furthermore, green spaces perform valuable ecosystems services that alleviate environmental risks to human health by mitigating the negative effects of climate change via urban cooling (Gill *et al.*, 2009) and capturing surface run-off so as to reduce the severity of flood events during heavy downpours or periods of prolonged precipitation (Lennon *et al.*, 2014).

These themes are further explored in Chapter 2, which outlines the evidence base on health and green space by developing a life-course perspective on health benefits across age cohorts.



1.4 Eco-Health Project: Pressures, Policy and Solutions

The Eco-Health Project was funded by the EPA's STRIVE programme and the HSE as a 2-year medium-scale project. The project was undertaken by an interdisciplinary team comprising researchers with a background in urban and rural planning, urban design, landscape architecture and environmental economics. This interdisciplinarity enabled a multimethod research design involving quantitative, qualitative and participatory approaches, further outlined below and detailed in Chapter 4. The project rationale can be summarised under the headings of pressures, policy and solutions:

- **Pressures.** Although there appears to be a clear association between high-quality environments and health/well-being, significant gaps in the literature and within the national policy context exist that provide a rationale for this research proposal. First, although there is recognition of the relationship between quality environments and health, there is a more limited understanding of the mechanisms and of the cause and effect relationships. Second, the existence of green space in a locality does not always equate with a health-promoting environment. For example, within an urban context, perceptions of vandalism, safety concerns and poor design may undermine the use of green space. Third, the potential of health-promoting environments may be undermined by the distribution of environmental goods across space and variable access according to socio-economic status, gender, age and cultural background, e.g. more affluent

neighbourhoods tend to be well served by parks or to have good access to environmental amenities (such as coastlines and riverside locations). Furthermore, green spaces often favour age-specific cohorts over others, e.g. providing formal play pitches for organised sports rather than more informal activities for older people, suggesting the need for an inclusive life-course perspective.

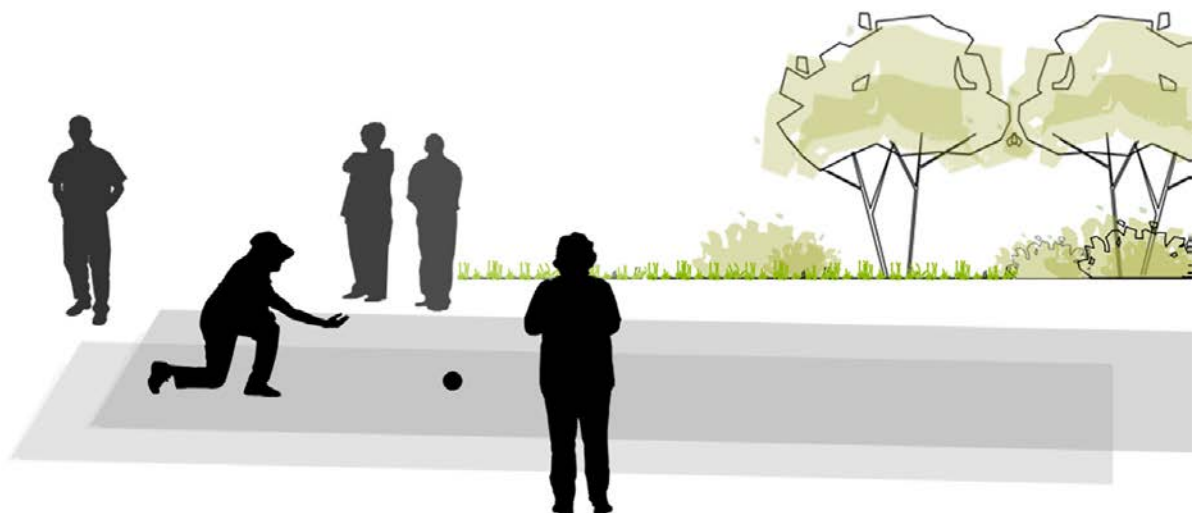
- **Policy.** This project aims to contribute to a range of international and national policy areas, creating a positive feedback loop between policies designed to enhance ecosystem services, policies for land use/spatial planning, local green space management and health promotion policies. The project seeks to inform policy development and design tools that facilitate the ready availability of a suitable array of green space actions for people of all ages and mobility capacities to ensure ease of access to lifelong healthy places. In this context, the research will advance the vision outlined in Healthy Ireland (Government of Ireland, 2013), i.e. "a Healthy Ireland, where everyone can enjoy physical and mental health and wellbeing to their full potential, where wellbeing is valued and supported at every level of society and is everyone's responsibility". The project has been purposely developed in response to the framework goals set out in the Healthy Ireland document by seeking to employ a robust evidence base to (1) produce planning and design tools targeted at increasing the proportion of people who are healthy at all stages of life; (2) formulate planning and design guidance on reducing health inequalities; (3) mobilise the ecosystems approach in developing ways to protect the public from

threats to health, and well-being, such as the urban heat island effect, deficits in the provision of quality recreational spaces and urban air pollution; and (4) create an environment in which every individual and sector of society can play their part in achieving a healthy Ireland, including state environmental protection and conservation agencies, local authorities and the property development sector. The project also seeks to inform key national strategic outcomes as outlined in the 2018 National Planning Framework (NPF) (DPHLG, 2018). This strategy aims to deliver more compact settlements, which requires attractive, liveable, well-designed, high-quality urban places where people enjoy a high quality of life and well-being. The strategy promotes the utilisation of the green infrastructure approach for sustainable land use management and emphasises the role of spatial planning in addressing the environmental and social determinants of health. The policy context is further assessed in Chapter 3.

- **Solutions.** Research-led spatial planning and design supply the means by which to translate academic investigation into practical solutions when seeking to deploy an ecosystems approach to enhancing human health and well-being (Barton and Tsourou, 2013). Specifically, “green infrastructure” planning provides a perspective that can help mainstream the health-related issues associated with green space planning through a focus on enhancing the mutually beneficial interactions between ecosystems and society (Tzoulas *et al.*, 2007). Although the theory and application of green infrastructure has grown in

depth and breadth over the past decade (Comhar, 2010; Dunn, 2010; Thomas and Littlewood, 2010; Wright, 2011; Barnhill and Smardon, 2012; Mayer *et al.*, 2012; Kilbane, 2013; Mell, 2013), the essence of the green infrastructure perspective remains unchanged. In sum, a green infrastructure perspective can be understood as seeking to provide for “an interconnected network of natural areas and other open spaces that conserves natural ecosystem values and functions ... and provides a wide array of benefits for people and wildlife” (Benedict and McMahon, 2006, p. 1). Prominent among these “benefits” is the provision of accessible natural green spaces for physical activity and psychological well-being. This thereby supports Action 3.10 of the HSE’s Healthy Ireland document, which seeks to create “activity friendly” environments. A green infrastructure perspective seeks to realise such benefits by giving greater consideration to the multifunctionality of green space in planning and design processes.

Therefore, the research seeks to advance understanding of the interface between health, ecology and planning by contributing theoretically and empirically to the international understanding of (1) environmental determinants of health/quality of life (e.g. Barton, 2010; Brereton *et al.*, 2008); (2) health-promoting environments (e.g. Kaplan and Talbot, 1983; Frumkin, 2003) and health benefits from green space (e.g. van den Berg *et al.*, 2010); (3) the role of green infrastructure approaches to urban planning and design in delivering healthy places (Benedict and McMahon, 2006; Roe and Mell, 2013; Lennon and



Scott, 2014); and (4) the mainstreaming of health-related issues through the research-led development of planning and design tools for decision-makers (Burns and Bond, 2008; Fischer *et al.*, 2010). Central to meeting these objectives is the development of robust evidence-based and publicly acceptable policies and design interventions that “unlock” unsustainable or suboptimal development trajectories or path dependencies towards *path creation* for more resilient and healthier social-ecological systems.

1.5 Research Aims and Report Structure

The Eco-Health project aims to identify and assess the health benefits of ecosystem services in an international and national context and identify policy implementation pathways for enhancing the health benefits from a high-quality environment. Therefore, the project aims to develop an evidence base to enhance decision-making and to provide evidence-informed design solutions to maximise health benefits from green spaces. The specific objectives of the study include:

- to provide a state of knowledge review of green space and health benefits to provide an evidence base for policymaking and practice;
- to provide an assessment of key policy drivers at the international and national level to provide a framework for enhancing green space health benefits;
- to evaluate the relationship between green space and health benefits within an Irish context and to examine the interactions and behaviour of local citizens and green space use;
- to develop, test and apply novel methods of community engagement to inform green space design that maximises health benefits;
- to develop recommendations and guidelines to enhance health-promoting environments and to integrate an ecosystem approach into relevant policy streams;
- to build capacity among key professional stakeholders to enhance and create health-promoting environments.

To meet these objectives, the research underpinning this report comprised four inter-related work packages (WPs):

1. *WP1 – state of knowledge review.* This WP provided an international state of knowledge review of the environmental determinants of health and well-being, exploring the relationship between green space and health. A wide range of literature was examined across the public health, psychology, geography, urban planning and landscape design disciplines. To provide a novel approach to reviewing the literature, an evidence base was developed using a life-course framework to examine health benefits across different age cohorts (see Chapter 2).² In addition, this WP also examined international good practice exemplars of green space design to develop transferable lessons for the Irish context.
2. *WP2 – national practice.* The aim of this WP was to provide an assessment of key international and national policy frameworks that provide key drivers for enhancing green space provision in the context of health and well-being. Internationally, this involved assessing international frameworks such as the UN’s SDGs and Habitat III, which highlight the contribution of green space to sustainable cities. Nationally, key policies were assessed, particularly the Healthy Ireland strategy, which signals a shift to a “whole-system” approach to health and well-being, and the 2018 NPF. Government planning guidance was assessed and local planning documents were examined relating to the three fieldwork case study locations: Offaly, Waterford and South Dublin. Examples of enhancing access to nature within the rural environment were also considered. To consolidate this review of the policy context, a series of 25 semi-structured in-depth interviews were undertaken with key policy stakeholders, including health and planning professionals, local authority officials, representatives from non-governmental organisations (NGOs) and representatives from semi-state bodies.

² This review has been published as follows: Douglas, O., Lennon, M. and Scott, M., 2017. Green space benefits for health: a life-course approach for urban planning, design and management. *Cities* 68: 53–62.

3. *WP3 – local case study analysis.* This WP aimed to provide local case study analysis to further enhance the evidence base on the provision of and access to green space and to examine the interactions and behaviour of local citizens with regard to green space use. Three local authority areas were selected to represent urban, suburban and rural experiences: South Dublin County Council, focusing on Tallaght town centre as an urban study, Waterford City and County Council, focusing on suburban areas, and Offaly County Council, as a rural case study, focusing on Banagher and Daingean villages. The local case studies comprised four key interlinked elements: (1) site visits to examine current green space provision; (2) a household survey to explore the interactions between green space and health; (3) community engagement “pop-up” events as participatory design; and (4) “choice experiments” to further explore green space preferences among local people. The research methodology is further outlined in Chapter 4.
4. *WP4 – guidance on enhancing ecosystem benefits of green space for health.* This WP focused on translating knowledge into action through dissemination of the project’s findings. In addition to this final report, this includes a

website and user-friendly “How to Guide” for green space design.

Accordingly, the report is structured as follows: Chapter 2 provides a review of the international literature on the health benefits of green space, specifically adopting a life-course perspective. Chapter 3 examines international and national policy contexts, highlighting policies that increasingly recognise and promote the health and well-being benefits of green space, creating more sustainable, liveable and inclusive places. Chapter 4 outlines in more detail the research approach and methodology adopted for the Eco-Health project. This includes a discussion of the theoretical approach underpinning the research and also the key stages of data collection and analysis. Chapter 5 provides insights from the household survey, focusing on perceptions and use of green space and green space attributes valued by survey participants. These attributes are further explored in Chapter 6 through reporting on a second survey that employed a “choice experiment” approach to test design attribute preferences. Chapter 7 develops and tests a methodology for community engagement for the participatory design of green spaces, applying this within the three case study areas. The final chapter reflects on the research findings and provides a series of recommendations for enhancing green spaces to maximise health benefits.

2 Developing an Evidence Base: Green Space Benefits for Health and Well-being

2.1 Introduction

Across the globe, urban policymakers are increasingly exploring the links between urban planning and public health as concerns rise about the impacts of urban environments on health outcomes and healthy lifestyles. In part, this reflects the early roots of modern urban planning, which emerged in the late 19th and early 20th centuries to tackle slum conditions in Europe's industrial cities (Barton, 2010). However, the renewed interest in health and urban planning inter-relationships today reflects the growing evidence that the environment is one of the key determinants of health and well-being, alongside inherited characteristics and socio-economic variables (Barton, 2009). Despite this interest, Crawford (2010) notes that close working relationships between urban planners and public health practitioners are remarkably scarce. Moreover, although studies of the environmental and place-based determinants of health and studies of subjective measures of well-being have increased significantly over the last decade, from a planning and design perspective this evidence base is often piecemeal (e.g. focused on a specific cohort), and translating public health knowledge into urban planning and design interventions and actual proposals remains problematic. In this chapter, we address this disconnect by exploring the role of green spaces in providing benefits for health and well-being.

Within the academic literature, over the past 10–15 years, there has been a re-emergence of interest on the impact of the environment on health in advanced economies, with a considerable expansion of theoretical and empirical studies investigating the role of contextual factors in the production and maintenance of health variations (Cummins *et al.*, 2007).³ Although there is a longstanding recognition of the negative impacts on health of environmental “bads”, such as poor air quality and the distribution of various forms of pollution, more recently increasing

attention has focused on the potential positive influence on health of environmental “goods”, such as well-designed and walkable cities, access to “nature”/biodiversity and the distribution of urban green space (Lake and Townshend, 2006). “Lifestyle illnesses” such as heart disease, obesity, type 2 diabetes, osteoporosis, mental illness and some cancers are increasingly attributed to the poor quality of the environment in our cities (Gregg *et al.*, 2000; Latkin and Aaron, 2003; Frank *et al.*, 2004; Lake and Townshend, 2006; Berke *et al.*, 2007; Gast *et al.*, 2007; Barton, 2010; Corkery, 2015; Coutts, 2016). The literature generally endorses the view that urban green spaces, as part of the wider environmental context, promote health and well-being in cities (Giles-Corti and Donovan, 2003; Ellaway *et al.*, 2005; Giles-Corti *et al.*, 2005; Maas *et al.*, 2006; Kaczynski and Henderson, 2007; Tzoulas *et al.*, 2007; Sugiyama *et al.*, 2010; Gascon *et al.*, 2016; WHO, 2016) and provide health services as part of a wider array of ecosystems services (Pretty *et al.*, 2011; Jackson *et al.*, 2013; Lennon and Scott, 2014). These health services are understood to range from direct positive effects on mental and physical health from increased biodiversity to improved well-being resulting from increased exposure to nature, physical activity and social engagement in green spaces (Sandifer *et al.*, 2015).

In response to the identified health benefits, high-level policy frameworks and guidance documents have increasingly promoted the creation of health-supporting urban environments through the increased provision of urban green space (see, for example, WHO, 2010, 2012, 2013; UNGA, 2015). Although such policy guidance clearly supports an emphasis on green space provision for population health and well-being, it does not provide detailed guidance for urban policy in terms of the specific attributes required to tackle lifestyle illnesses in multiple cohorts. This is partly consequent on the aggregation and homogenisation

³ Understanding the environment as having a “contextual effect” on health implies that similar individuals will have a different health status in different types of places (whereas the “compositional effects” on health concern individual characteristics within places) (Omariba, 2010).

of different spatial typologies in much planning and design policy into a measure of so-called “green space”, without further qualification as to the type or quality of such spaces.

Of particular significance is how this homogenisation fails to account for the health benefits afforded to different users by different types of green space distributions and configurations (Bedimo-Rung *et al.*, 2005; Velarde *et al.*, 2007; Bowler *et al.*, 2010; Jorgensen and Gobster, 2010; Hartig *et al.*, 2014). Furthermore, where locational and demographically specific design guidelines for the planning, design and maintenance of green open space do exist in local contexts, the extent to which they reflect or respond to empirical evidence relating to the green space–health relationship can be disputed. Indeed, the health benefits they assert may instead emerge from designs and practices founded on ecosystems protection, flood mitigation or landscape beautification. Such motivations do not necessarily correspond with improved amenity or health benefits (see Figure 2.1 for a successful example from Balbriggan).

This chapter addresses these issues by collating and reviewing the large quantity of evidence linking health, well-being and green space, and distilling it in a manner that renders it both accessible and useful

for those involved in the planning and design of urban green spaces. This is achieved by adopting a novel life-course approach to examine the evidence for health and well-being benefits accruing from green space, from prenatal development through childhood, adolescence, adulthood and old age.

A literature search was undertaken using research databases including Scopus, Web of Science and Google Scholar. “Green space” and “health” search terms and their variants were applied and identified articles were grouped by life-course stage. In order to ensure that all key empirical studies were included, comprehensive review articles were subsequently identified and their references were cross-checked with the initial articles. Finally, the most recent articles in quality peer-reviewed journals citing these review articles were identified. Informed by the evidence collated and reviewed here, we propose planning and design interventions for each cohort group. Following this, we synthesise the key findings from the review of cohort-specific studies to formulate a series of cross-cutting interventions for health-promoting urban green space. We conclude by suggesting a path for future research and practice. It is intended that this approach can facilitate the formulation of site-specific planning guidance for the provision of more inclusive green



Figure 2.1. Balbriggan Public Realm Plan – sketch proposal for Mill Park Balbriggan showing a range of user activities incorporating additional tree planting and greening, with attractive waterside uses catered for in and around a newly formed weir pool. A formal paved terrace and a playground create opportunities for events and children’s play respectively. Source: Áit Urbanism + Landscape.

spaces that respond to the varying needs of people across all life-course stages.

2.2 Green Space and Health across the Life-course

Numerous studies have investigated whether or not there is an association between people's access to green space or nature and personal levels of activity. More specifically, studies have examined how the design of the public realm encourages people to be more physically active, if it contributes to improved health outcomes or if it encourages people to be more active (de Vries *et al.*, 2003; Hillsdon *et al.*, 2006; Kessel *et al.*, 2009; Coombes *et al.*, 2010; Ord *et al.*, 2013). The majority of such studies have found that living in proximity to urban green space is generally associated with increased physical activity, positive health behaviours and improved health outcomes (Giles-Corti and Donovan, 2003; Ellaway *et al.*, 2005; Giles-Corti *et al.*, 2005; Maas *et al.*, 2006; Kaczynski and Henderson, 2007; Tzoulas *et al.*, 2007; Sugiyama *et al.*, 2010; Gascon *et al.*, 2016). However, rather than definitively verifying the trope that living close to any urban green space results in positive health behaviours, results have often varied by population cohort (see, for example, de Vries *et al.*, 2003; Maas *et al.*, 2006; Gascon *et al.*, 2016) and their perceptions of green space (Van Dyck *et al.*, 2011; Ord *et al.*, 2013; WHO, 2016).

Furthermore, propensity to spend time outdoors is known to stem from childhood. For example, Ward Thompson *et al.* (2007) identified a strong relationship between frequent childhood visits to green space and being prepared to visit such places alone as an adult. Consideration of such "tracking" is important from a health standpoint as childhood inactivity has been identified as a key risk factor in many chronic diseases of later life (Marmot and Brunner, 2005; Wichstrøm *et al.*, 2013), and early socially stimulating environments have been shown to strongly inform later emotional well-being and cognitive capacity (Danner *et al.*, 2001; Jenkins *et al.*, 2008). To better understand the evidence in a manner that is accessible for planning and urban design professionals, a life-course approach is advanced to provide a more nuanced account of green space and health relationships and how these translate to practice and design beyond a one-dimensional focus on quantity of provision.

2.2.1 Prenatal development

The potential benefits of green space to human health have been traced right back to the prenatal condition. The effect of greenness on pregnancy and birth outcomes has been studied extensively and positive associations between greenness and the birthweight of babies have been observed across the majority of studies (Dadvand *et al.*, 2012a,b, 2014; Agay-Shay *et al.*, 2014; Markevych *et al.*, 2014a; Hystad *et al.*, 2015). Studies have also linked increased exposure of pregnant mothers to green space with lower odds of a child being small for gestational age or preterm/premature (Hystad *et al.*, 2015) and lower infant mortality risk (Kihal-Talantikite *et al.*, 2013). Some studies have modelled complex exposures, including air pollution (Dadvand *et al.*, 2012b), neighbourhood walkability and noise (Hystad *et al.*, 2015), with associations between increased greenness and improved birth outcomes identified (James *et al.*, 2015). Perhaps of greatest interest to planning are the mechanisms by which green space exposure of pregnant mothers potentially influences positive birth outcomes. Research undertaken by Dadvand *et al.* (2012b) revealed that exposure of pregnant women to green space and nature may have affected birth outcomes by altering their levels of physical activity, reducing maternal stress, enhancing social contacts among mothers, reducing maternal noise and air pollution exposure and moderating ambient temperatures. The majority of analyses have adjusted for race, maternal age, season of conception, area-level socio-economic factors and child's sex, with consistent results identified (James *et al.*, 2015).

Although studies broadly indicate that there is strong evidence for associations between surrounding greenness and improved developmental and birth outcomes, a number of studies have identified potential variability between socio-economic and cultural groups. For example, Dadvand *et al.* (2012a) identified increased birth weights among the lowest educated only for those who had higher surrounding green space or who lived close to a major green space. Furthermore, stronger associations between greenness and birth outcomes were variously observed among those whose parents had a lower level of education and lower socio-economic status (Dadvand *et al.*, 2012b; Agay-Shay *et al.*, 2014), as well as for mothers of white race compared with immigrants (Dadvand *et al.*, 2014a).

However, on balance, the evidence suggests that maternal interactions with and within green spaces are beneficial for prenatal development and birth outcomes. Table 2.1 summarises the key issues and, based on the evidence, suggests general planning and design interventions.

2.2.2 Childhood

A growing number of studies have suggested that children increasingly suffer from a “nature-deficit disorder” (Louv, 2005) because of a reduction in time spent playing outdoors, potentially as a result of increased use of technology, parental and societal fears for child safety (Godbey, 2009; Derr and Lance, 2012; Derr *et al.*, 2013; Mustapa *et al.*, 2015) and an aversion to nature (Bixler and Floyd, 1997). In this context, studies have investigated multiple aspects of childhood health in terms of green space exposure, both physical and psychological.

Research has shown that green space exposure may influence the propensity to develop cardiovascular disease (CVD) at any age, through the mediation of physical activity (Blair and Morris, 2009), stress, social engagement (Albus, 2010), and noise and air pollution exposure (Hu *et al.*, 2008). For example, Markevych *et al.* (2014b) undertook a cross-sectional analysis of the effects of residential greenness on blood pressure in 10-year-old children and observed lower systolic

and diastolic blood pressure among children from a birth cohort who had higher residential greenness, after accounting for temperature, air pollution, noise and urbanisation.

Other studies have explored the potential relationship between green space and health in the context of contemporary lifestyles and behaviours in children. Research by Dadvand *et al.* (2014b) found that surrounding greenness was associated with 11–19% lower relative prevalence of overweight/obesity and excessive screen time (i.e. watching television, playing computer games, etc.). In a study by Almanza *et al.* (2012), higher odds of physical activity were identified among 8- to 14-year-olds when in greener areas than in less green areas. Adding further weight to this body of evidence, a prospective study including children and youth aged 3–16 years by Bell *et al.* (2008) found that higher greenness levels were significantly associated with lower body mass index (BMI) values after 24 months. A greater quantum of greenness was also associated with lower odds of children and youth increasing their BMI over 2 years, presumably because of increased levels of physical activity or time spent outdoors. In support of this assumption, an association between increased greenness of the play environment and increased playtime outdoors among preschool children has been identified by Grigsby-Toussaint *et al.* (2011). Indeed, perceived lack of green space and low playground space have been

Table 2.1. Issues and interventions in planning and designing green spaces for health and well-being in prenatal development

Issues	References	Interventions
Positive associations between greenness and birth weight	Kihal-Talantikite <i>et al.</i> (2013); Markevych <i>et al.</i> (2014a); Hystad <i>et al.</i> (2015)	Maximise greenness in the urban residential environment (views of trees, shrubbery, green spaces, etc.)
Exposure of pregnant women to green space alters their levels of physical activity, reduces maternal stress, enhances social contacts among mothers, reduces maternal noise and air pollution exposure and moderates ambient temperatures	Dadvand <i>et al.</i> (2012b); Agay-Shay <i>et al.</i> (2014); Hystad <i>et al.</i> (2015)	Safe and accessible walkways with regular seating areas should be provided for moderate exercise and social interaction. Green spaces should be of sufficient size, located at a distance from noise sources and include appropriate planting regimes to supply seated “quiet areas” for rest and relaxation
Increased birth weights among the lowest educated and those of lower socio-economic status who have higher surrounding green space or live close to a major green space	Dadvand <i>et al.</i> (2012b); Agay-Shay <i>et al.</i> (2014)	Provide well-distributed, accessible green space in areas characterised by social deprivation. Park design should encourage use by pregnant women through the provision of attractive walkways and the frequent provision of park furniture, as well as amenities such as clean public toilets
Stronger associations between greenness and birth outcomes for mothers of white race compared with immigrants	Dadvand <i>et al.</i> (2014a)	Planning and design professionals should engage with pregnant women from immigrant and minority groups to identify barriers to and opportunities for green space usage

independently associated with being overweight in preschool children (Schule *et al.*, 2016).

A number of studies have also considered greenness in relation to developmental behavioural outcomes in children. In an examination of the impacts of environments on attention in children with attention deficit hyperactivity disorder (ADHD), Taylor and Kuo (2009) found that subjects concentrated better after a walk in the park than after a downtown walk or a walk in the neighbourhood, concluding that “doses of nature” might serve as a safe, inexpensive, widely accessible way to manage ADHD symptoms. In a prospective study of 7- to 10-year-old primary school children, Dadvand *et al.* (2015) observed improved cognitive development in children exposed to green surroundings, controlling for factors such as socio-demographics and pollution. Additionally, a study by Kytä *et al.* (2012) identified that 10- to 15-year-olds were more likely to report that they had very good health when there was significant green space around their home, after controlling for neighbourhood socio-economic status. Markevych *et al.* (2014c) observed that increased distance to the nearest green space from a child’s residence was positively associated with the odds of hyperactivity and inattention, but this association was statistically significant only among males, thereby suggesting that the gender of the child might affect the positive health benefits accrued from nearby green space.

Further evidence suggests that there may be important distinctions among green spaces that make some more health supportive than others for children. As discussed by Wheeler *et al.* (2015), research from the UK indicates that different types of urban green space

(using a broad typology, e.g. “sports”/“natural”) may promote physical activity to different extents among children. Although not focusing specifically on children, Saelens *et al.* (2006) identified the assessment of the presence and number of design elements and sub-elements – especially for paved footpaths and play equipment and field and court items – as key to understanding green space usage. “Specific qualities” items (e.g. continuity of a trail, drainage of slide landing area) were generally rated reliably. The qualities rated across various element categories, including condition, coverage/shade and openness/visibility, also had good reliability.

Overall, the evidence clearly suggests that childhood interactions with and within green spaces are beneficial for the health of children, both physical and psychological, as well as for their social and intellectual development. Variations in associations between green space benefits and the gender and socio-economic group of which a child is a member suggest the need for green space interventions that respond to these variations and attract children from all backgrounds to green space and away from television and computer screens (Wells and Lekies, 2006; Weiss *et al.*, 2011; Lachowycz *et al.*, 2012; Lovasi *et al.*, 2013). Table 2.2 outlines the key issues identified in the literature for green space–health associations in children and sets out some design interventions to respond to these issues.

2.2.3 Adolescence

A particular focus on adolescents is considered important, as not only is this group increasingly prone

Table 2.2. Issues and interventions in planning and designing green spaces for health and well-being in childhood

Issues	References	Interventions
Childhood inactivity and disconnection from nature leads to negative physical and mental health outcomes	Bell <i>et al.</i> (2008); Hu <i>et al.</i> (2008); Blair and Morris (2009); Godbey (2009); Albus (2010); Almanza <i>et al.</i> (2012); Derr and Lance (2012); Kytä <i>et al.</i> (2012); Derr <i>et al.</i> (2013); Dadvand <i>et al.</i> (2014b, 2015); Markevych <i>et al.</i> (2014b); Mustapa <i>et al.</i> (2015)	Well-equipped and well-designed green spaces should be provided to encourage physical activity and engagement with nature among children. Evidence suggests that “designing in” certain elements can facilitate this (e.g. paved walkways, play equipment, fields and courts)
Association between surrounding green space and cognitive, behavioural and social development in children	Kytä <i>et al.</i> (2012); Markevych <i>et al.</i> (2014c); Dadvand <i>et al.</i> (2015)	Maximise greenness in the design of the urban residential environment (e.g. incorporating trees, shrubbery and flowerbeds into the streetscape) and supply a well-distributed variety of accessible pocket parks in proximity to residential units
Increased neighbourhood vegetation associated with decreased risk for overweight children	Lovasi <i>et al.</i> (2013)	

to physical inactivity, but also studies have shown that people are more likely to be physically active as adults if they were physically active in their late teens (Anderssen and Andersen, 2004; Gardsjord *et al.*, 2014). Hence, it is important to protect, develop and design urban green spaces with qualities that facilitate and promote physical activity in adolescence.

In *Growing up in an Urbanizing World*, Chawla (2002) observed that the neighbourhood features that teenagers valued in the 1990s compared with the 1970s remained remarkably consistent. Young adolescents reported using overgrown vacant land for exploring, creative play and hideaways, and used parks for meeting friends, hanging out, active play and appreciating trees and gardens (Chawla, 2015). In a recent study by Woodgate and Skarlato (2015), 71 adolescents (12–19 years old) defined environments that support good health as “being outside” in a safe, clean, green and liveable space. Indeed, multimethod evaluations continue to show that safe, accessible green spaces are highly prized by adolescents (Derr *et al.*, 2013; Malone, 2013). In this context, Gardsjord *et al.* (2014) identified 32 studies exploring which environmental characteristics contribute to physical activity among youth (age group 8–21 years). The characteristic most frequently reported to promote physical activity was access to green space, measured either as distance from one’s home to parks and green areas or as the percentage green coverage or number of recreational facilities in the neighbourhood. The higher the amount and the closer the distance, the more a park is used, with positive effects on physical activity. The second most frequently reported factor was the presence of informal sports facilities and other facilities for movement open to the public. The presence of such elements was generally found to have positive effects. However, these types of competitive sports facilities sometimes attract only certain groups of participants, mainly dominated by boys (Limstrand and Rehrer, 2008). As suggested by Cohen *et al.* (2006), girls might need other types of facilities such as attractive walkways.

Another characteristic reported to be positively related to physical activity in youth is safety, described both as absence of crime and as being related to features such

as lighting (Gardsjord *et al.*, 2014). Park maintenance and renovation were additional components frequently reported as important. Maintenance can be related to safety, as a well-maintained park is likely to feel safer (Kruger and Chawla, 2002). Gender differences have also been identified with regard to the importance of safety for the use of urban parks and green spaces, with girls found to be more concerned with safety aspects than boys (Loukaitou-Sideris and Sideris, 2009).

In summary, the design of parks that promote physical and social well-being in teenagers emerges as a potentially key focus for policymakers in promoting lifelong physical and psychological health and well-being through childhood, adulthood and old age. When gender differences arise, sensitive design interventions can address different user needs by balancing dedicated play and sporting infrastructure with safe and accessible pathways, informal sheltered seating areas and improved accessibility. Table 2.3 identifies the key issues and interventions for the design of green spaces for “healthy teenagers” arising in the literature.

2.2.4 Adulthood

The association between increased greenness and improved health outcomes in adults has been investigated in numerous studies. In terms of physical health, CVD is one of the primary health effects of inactivity and stress associated with modern lifestyles. Cross-sectional research broadly supports an association between increased greenness and a range of improved cardiovascular outcomes in adults (Hu *et al.*, 2008; Mitchell and Popham, 2008; Richardson and Mitchell, 2010). Even more convincingly, a robust prospective survival analysis by Villeneuve *et al.* (2012) linked higher levels of greenness with a lower risk of CVD, as well as a reduced risk of ischaemic heart disease⁴ and reduced stroke mortality after adjustment for ambient air pollution. Further supporting the green space–physical health association, research by Astell-Burt *et al.* (2014a) found that the risk of type 2 diabetes was significantly lower in greener neighbourhoods, controlling for demographic and

⁴ Also known as coronary artery disease, ischaemic heart disease is a blockage or narrowing (stenosis) of the arteries that supply blood to the heart muscle, often due to a build-up of fatty plaque inside the arteries. A severe enough blockage may cause a heart attack.

Table 2.3. Issues and Interventions in planning and designing green spaces for health and well-being in adolescence

Issues	References	Interventions
High-quality neighbourhood green spaces are highly valued by teenagers. The higher the amount and the closer the distance, the more a park is used, with positive effects on physical activity and social development	Gardsjord <i>et al.</i> (2014)	To encourage increased use, accessible green spaces should be provided as multiuse areas open for a range of different activities. Abundant paths for walking and cycling that connect various activity zones and create opportunities for exercise should be provided. Drinking water sources, proximate to both facilities for movement and zones for relaxation/social engagement, should be provided
Informal and formal green spaces are used by adolescents for different purposes	Chawla (2002, 2015); Gardsjord <i>et al.</i> (2014)	Provide informal green spaces (i.e. wildflower meadows, scrub and untended vegetated areas) for exploring, for creative play, as hideaways and as important zones of shelter and relaxation for teenagers. Provide more organised spaces with pathways and seated and sheltered areas for socialising. Provide sports facilities and other facilities for movement/physical activity (e.g. fields for different ball games and gymnastic bars). These zones should also include seating possibilities
Competitive sports facilities sometimes attract only certain groups of participants, mainly dominated by boys	Cohen <i>et al.</i> (2006); Limstrand and Rehner (2008)	Although competitive sports facilities should be provided where possible, facilities such as walkways and paths should also be provided. Safe paths lined with carefully selected planting, both leading to and within parks, are potentially important for the enhancement of physical activity for adolescents of both genders, by offering spaces for incidental exercise and interaction, both by and between genders
Attractive and safe green spaces are highly valued by adolescents and their parents. Furthermore, girls have been found to be more concerned with safety aspects than boys	Kruger and Chawla (2002); Loukaitou-Sideris and Sideris (2009); Derr <i>et al.</i> (2013); Malone (2013); Gardsjord <i>et al.</i> (2014); Woodgate and Skarlato (2015)	In general, a well-maintained park is likely to feel safer. As such, good maintenance and renovation regimes should be implemented. Paths should be kept clear and well lit with passive and active surveillance encouraged to enable use outside daylight hours. Although “informal” areas should be natural looking, they should be overlooked to improve safety

cultural factors, especially among participants residing in neighbourhoods with 41–60% green space land use. This association was consistent after controlling for other explanatory variables and did not vary according to neighbourhood circumstances.

In terms of behaviour, research by Sugiyama *et al.* (2013) identified a positive association between proximity to green spaces, in particular larger green spaces, and a higher likelihood of walking maintenance over 4 years. These findings are consistent with those reported in earlier cross-sectional studies examining park attributes and walking (Giles-Corti *et al.*, 2005; Sugiyama *et al.*, 2010) and suggest that having a park nearby or having a larger park within walking distance may help residents to maintain their walking behaviour. Furthermore, greater neighbourhood greenness or access to green space has been associated with reduced risks of stress, propensity to psychiatric morbidity, psychological

distress, depressive symptoms, clinical anxiety and depression prevalence, and mood disorder treatment in adults (Grahn and Stigsdotter, 2003; Annerstedt *et al.*, 2012; Astell-Burt *et al.*, 2013, 2014b; de Vries *et al.*, 2013; Nutsford *et al.*, 2013; White *et al.*, 2013; James *et al.*, 2015). The presence of more green space has also been linked with healthier cortisol⁵ profiles whereas less green space, typical of deprived neighbourhoods, has been shown to produce higher stress levels and flattened cortisol profiles in adults, indicating a poorer capacity to recover from stress (Ward Thompson *et al.*, 2012; Roe *et al.*, 2013).

To control for the potential mediating effects of intervening variables, a number of studies have variously explored the mediating effects of physical activity, social contact, social cohesion and green space types in exploring the association between mental health and green space in adults (Sugiyama *et al.*, 2008; Maas *et al.*, 2009; Fan *et al.*, 2011; de

⁵ Cortisol is a life-sustaining adrenal hormone. Called “the stress hormone”, cortisol influences and regulates many of the changes that occur in the body in response to stress.

Vries *et al.*, 2013). In this context, de Vries *et al.* (2013) undertook analysis of the association between the quantity and the quality of streetscape greenery and self-reported health and found that both quantity and quality of streetscape greenery were related to perceived general health, acute health-related complaints and mental health in adults. Relationships were generally stronger for quality than for quantity. In another study, Sugiyama *et al.* (2008) collected survey data relating to physical and mental health scores, perceived neighbourhood greenness, walking for recreation and for transport, social coherence, local social interaction and socio-demographic variables. Analysis revealed that, after adjusting for socio-demographic variables, those who perceived their neighbourhood as being highly green had 1.37 and 1.60 times higher odds of better physical and mental health, respectively, than those who perceived their neighbourhood to have the lowest level of greenness.

Focusing more on green space characteristics and quality, Fan *et al.* (2011) observed that different components of neighbourhood green space play distinct roles in influencing stress, concluding that parks indirectly mitigate stress by fostering social support. Further exploring the potential impact of green space components on perceived health, a study by Grahn and Stigsdotter (2010) on the relationship between sensory perception of natural environments and human health found that adults identify a preference for “serene” green space, followed by increased “space”, “nature”, “species richness”, “refuge”, “culture”, “prospect” and “social” dimensions. The dimensions of “refuge” and “nature” were found to be most strongly correlated with stress, suggesting that stressed individuals may seek out the most restorative environments. From a design perspective, the study suggests that a combination of refuge, nature and species richness could be interpreted as the most restorative environment for stressed individuals. Similarly, Astell-Burt *et al.* (2013) found that those in the greenest neighbourhoods were at a lower risk of psychological distress. In this study, an interaction was observed between physical activity and green space, that is, more green space did not appear to benefit mental health among the least active, but there was a protective association for the more physically active. Adding further to this growing body of evidence, recent exploratory research by Jakubec *et al.* (2016) identified a positive trend towards improved

depression markers, greater health satisfaction and improved social relationships (in particular, love and friendship), as well as satisfaction with a sense of community and experiences of helping among adults with disabilities and their caregivers, as a result of direct exposure to nature and green space.

Reflecting on this body of knowledge suggests that the green space–health association increases in complexity in adulthood. As behaviours and attitudes towards physical activity and green space usage have been shown to develop in and track from childhood and adolescence (Danner *et al.*, 2001; Jenkins *et al.*, 2008), such associations (or dis-associations) would seem to be characterised by complex interactions pertaining to individual-level factors, beyond gender and socio-demographics. Nevertheless, the evidence for the green space–health association among adults is robust overall. Table 2.4 sets out the key issues identified in the literature and suggests design interventions to maximise the green space–health association in adults.

2.2.5 Later life

The mechanisms through which green space affects health may ultimately affect the lifespan. James *et al.* (2015) identified a range of studies recording links between greenness and mortality. The earliest was a prospective longevity analysis by Takano *et al.* (2002), undertaken in Japan. This study asked senior citizens about the characteristics of their residential surroundings. Five years later, survival rates were highest among those reporting tree-lined streets near their residence. Several analyses have subsequently examined larger scale data, including the study by Mitchell and Popham (2008) undertaken in the UK. Using a land use dataset, this study observed a 6% lower mortality rate in administrative areas characterised by higher greenness than in areas characterised by low greenness. A similar study across the UK found that cardiovascular and respiratory mortality rates decreased with increasing green space among men, but not among women (Richardson and Mitchell, 2010). Furthermore, higher rates of stroke deaths have been recorded in areas characterised by low greenness (Hu *et al.*, 2008), and increased exposure to greenness proximate to place of residence has been linked with reduced overall non-accidental mortality among elderly inhabitants (Villeneuve *et*

Table 2.4. Issues and interventions in planning and designing green spaces for health and well-being in adulthood

Issues	References	Interventions
Higher levels of green space are linked with a lower risk of CVD, ischaemic heart disease and type 2 diabetes and reduced stroke mortality	Hu <i>et al.</i> (2008); Mitchell and Popham (2008); Richardson and Mitchell (2010); Villeneuve <i>et al.</i> (2012); Astell-Burt <i>et al.</i> (2014a)	Maximise greenness and green space provision in the urban residential environment (trees, shrubbery, green spaces, etc). Incorporate spaces for walking, cycling and engagement with nature (e.g. wildflower borders) in such areas
Association between proximity to green spaces – in particular, larger green spaces – and a higher likelihood of walking maintenance among adults	Giles-Corti <i>et al.</i> (2005); Sugiyama <i>et al.</i> (2010, 2013)	Existing walking behaviours can be maintained by providing accessible green spaces of a usable size proximate to urban residences. Such spaces should include a series of walking paths of different lengths that provide opportunities to traverse a variety of different environments (meadow, woodland, pondside, etc.) and incorporate hills and plains to facilitate varying degrees of challenge
Green space is associated with reduced risk of stress, propensity to psychiatric morbidity, psychological distress, depressive symptoms, clinical anxiety and depression prevalence and mood disorder treatment in adults	Annerstedt <i>et al.</i> (2012); Astell-Burt <i>et al.</i> (2013, 2014b); de Vries <i>et al.</i> (2013); Nutsford <i>et al.</i> (2013); Roe <i>et al.</i> (2013); White <i>et al.</i> (2013)	Maximise green space provision and access in the urban residential environment. Incorporate opportunities to engage with nature for stress relief, such as the provision of pond-side benches, woodland walks and edible flowerbeds
Those in the greenest neighbourhoods are found to be at the lowest risk of psychological distress and are less sedentary, suggesting an interaction between physical activity and green space	Grahn and Stigsdotter (2010); Astell-Burt <i>et al.</i> (2013)	Increase proximity, exposure and access opportunities to a variety of different types of green spaces (sizes, configurations and attributes) to supply a diversity of experiences and choice. Provide allotments to facilitate engagement with nature and the potential for social interaction.
The mediating effect of stress and social cohesion on green activity emphasises the potential mental and social benefits of green space	de Vries <i>et al.</i> (2013)	Incorporate communal seating areas in parks with desirable vistas to encourage use and informal social interactions among park visitors
Perceived greenness is associated with better physical and mental health – correlated with recreational walking and social engagement	Sugiyama <i>et al.</i> (2008); Maas <i>et al.</i> (2009); Grahn and Stigsdotter (2010)	
Improved depression markers, greater health satisfaction and improved social relationships, as well as satisfaction with a sense of community and experiences of helping among adults with disabilities and their caregivers, as a result of direct exposure to green space	Jakubec <i>et al.</i> (2016)	

al., 2012). These findings complement research conducted by Kweon *et al.* (1998), who investigated the relationship between older adults' exposure to nearby public green spaces and their level of social integration and attachment to local community. This study determined correlations between the use of public green space and the strength of neighbourhood social ties and sense of community for older adult residents of inner-city neighbourhoods.

With increasing frailty, going outdoors independently is often the first set of activities that elderly people find difficult to perform (Shumway-Cook *et al.*, 2003). The resulting sedentary lifestyle is considered a genuine health risk for older people (WHO, 2003). In this context, opportunities to access high-quality outdoor environments catering for the specific needs of the elderly may play an important role in maintaining and

enhancing health and well-being in later life. In their study of this issue, Sugiyama and Thompson (2007) argue that an environment that makes the choice of whether or not to go out easy and enjoyable is likely to induce more frequent and possibly habitual use of the outdoors. Hence, planning and urban design can facilitate green space activity and recreation among older people and their caregivers by providing proximate, accessible and safe green spaces with well-maintained walking infrastructure that is safe and wheelchair accessible. Such provision can act to encourage older people to observe, use and benefit from public green space for as long as their health condition allows. Table 2.5 sets out the key issues identified in the literature and suggests design interventions to maximise the green space–health association in older adults.

Table 2.5. Issues and Interventions in planning and designing green spaces for health and well-being in later life

Issues	References	Interventions
Higher survival rates from CVD conditions and stroke proximate to tree-lined streets and green environments	Takano <i>et al.</i> (2002); Hu <i>et al.</i> (2008); Mitchell and Popham (2008); Villeneuve <i>et al.</i> (2012); Wilker <i>et al.</i> (2014)	Maximise exposure to greenness in the urban residential environment by carefully incorporating planting designs into the streetscape. Provide accessible green space of varying sizes in close proximity to residential areas (e.g. regular spatial distribution of pocket parks)
Male cardiovascular and respiratory mortality rates decrease with increasing green space	Richardson and Mitchell (2010)	
Non-exercise physical activity found to reduce the risk of first-time CVD and all-cause mortality	Ekblom-Bak <i>et al.</i> (2014)	Incorporate opportunities for incidental and leisurely engagement with the environment into the design of green spaces (e.g. areas for berry picking, fragrant and colourful flowerbeds)
Relationships established between the use of green outdoor common space and the strength of neighbourhood social ties and sense of community for older adult residents of inner-city neighbourhoods	Kweon <i>et al.</i> (1998)	Provide accessible walkways that vary in length and degree of difficulty and that traverse various environments (e.g. open grassland, riverside). Such walkways should be of a high-grade finish to reduce falls. Provide sheltered seating areas with interesting vistas that facilitate social interaction, e.g. for art classes. Provide spaces for leisurely game play appropriate to elderly abilities (e.g. bowling greens, chess tables)

2.3 Developing an Integrated Green Space Framework for Health and Well-being

In adopting a life-course approach, this review has identified key variations within and between population cohorts regarding the green space attributes that promote health and well-being, that is, it has demonstrated how different green space configurations afford different activities and promote different physical and psychological responses for different age groups. As such, this life-course approach facilitates a more nuanced understanding of those green space attributes that promote health and well-being than is normally evident in much research in this field, consequent on such research being generally cohort specific and focused on a particular selection of variables. Hence, the remaining challenge is to synthesise this multi-cohort perspective into a green space framework for health and well-being. It is in this context that Table 2.6 draws together the key findings from Tables 2.1–2.5 to identify the most pertinent evidence-based interventions that can maintain and improve population health across the life course. The table outlines four interventions applicable across all cohorts (universally cross-cutting). These are subdivided into “planning”, “design” and “management” interventions to facilitate ease of reference for different disciplines involved in the delivery and maintenance of green spaces. The

table also identifies five interventions that span the health-promoting requirements of more than one cohort. Thus, employing this table enables those engaged in green space provision to target specific interventions that maximise benefit by catering for the needs of multiple user groups. In doing so, this framework allows practitioners to create inclusive health-promoting green spaces via interventions substantiated by a significant bank of medical, psychological and social scientific research.

2.4 Conclusion

Urbanisation and the associated increase in obesogenic environments are creating health and well-being challenges for the planning and design of urban environments (Davies, 2013). Concomitantly, green spaces in cities are increasingly viewed as providing locations for “restorative” contact with nature, physical activity and social engagement, which evidence suggests positively influences well-being and triggers behavioural change towards a healthier lifestyle (van den Berg *et al.*, 2010; Beyer *et al.*, 2014; Corkery, 2015). However, current research in this field is generally limited to studies of specific cohorts and isolated variables. Consequently, there is a dearth of literature that synthesises such studies in a format that is easily deployable when seeking responses to the needs of multiple cohorts in the planning and design of green spaces. This chapter has sought to address

Table 2.6. An integrated green space framework for health and well-being

	Cohort cross-cutting					Universally cross-cutting	
	Provide formal facilities for vigorous activity, such as sports courts, all-weather pitches, outdoor gymnasiums and skate parks	Provide facilities for less vigorous physical activity that encourages social interaction and/or engagement with nature (e.g. bowling greens, sheltered outdoor class spaces, chess tables, allotments, fragrant and colourful flowerbeds)	Provide informal green spaces for exploration and adventure (e.g. wildflower meadows, scrub and untended vegetated areas, untended woodland areas)	Incorporate opportunities for incidental and leisurely engagement with the environment into the design of green spaces (e.g. areas for berry picking, fragrant and edible flowerbeds)	Provide frequent sheltered seating areas, drinking water sources and toilets	Planning: Maximise streetscape greenness and green space provision in the urban residential environment (exposure, proximity and accessibility) Engage all users in park planning, with a special focus on minority groups and those in lower socio-economic classes, ensuring equal representation from each cohort to identify barriers to and opportunities for green space usage Design: Provide an array of walking paths of different lengths that offer opportunities to traverse a variety of different environments and incorporate hills and plains to facilitate varying degrees of challenge Management: Institutionalise good maintenance and renovation regimes. Paths should be kept clear and well lit, with passive and active surveillance encouraged to enable use outside daylight hours. Although "informal" areas should be natural looking, they should be overlooked to improve safety	
Interventions ▶							
Cohorts ▼							
Prenatal	✓			✓	✓		
Childhood	✓		✓	✓	✓		
Adolescence	✓		✓				
Adulthood	✓	✓					
Life-course stage							
Later life		✓			✓		

this gap by adopting a novel life-course approach that surveys such evidence and develops an integrated green space planning and design framework for health and well-being, providing a complementary perspective to research on gender and socio-economic differences.

In this context, however, the relationship between proximity, accessibility and green space design and health outcomes needs further investigation. In particular, future empirical research needs to focus in greater detail on the health “services” that different types of green spaces afford to specific cohorts. For instance, although this review has considered age-cohorts across the entire life course, these can be further divided into sub-cohorts (groups). For example, people who fall into the lower and upper end of old age (e.g. a 69-year-old versus an 89-year-old) are distinct not only in physical terms, but also in psychological terms (Baltes and Smith, 2003). As suggested by Sugiyama and Thompson (2007), older people in a deprived neighbourhood may also have unique problems with regard to outdoor environments. As such, it is clearly important to understand salient aspects of urban environments that have a bearing on health and quality of life for each cohort and subgroup. Knowledge from such research will help to identify and detail effective ways to plan and design healthy green spaces for all demographic and socio-economic cohorts in the contemporary city.

An enhanced evidence base and a more nuanced understanding of the causal mechanisms and relationships are essential to developing appropriate responses and urban interventions. This is particularly the case as green space is delivered through diffuse modes, including traditional public ownership, community trusts, public–private partnerships and,

increasingly, developers, as a component of planning gain in the development control system. Similarly, spatial plans are often characterised by a focus on the quantum of provision or measures of accessibility and not the actual health-promoting benefits of green spaces, which should be understood as part of the plan formation and Strategic Environmental Assessment (SEA) process. This may also necessitate a sea change in the way that policymakers “value” land. For example, inner urban brownfield sites are often assessed in relation to their potential real-estate or regeneration value (i.e. as land “awaiting” development), when an alternative approach would be to value the land in relation to its health services potential (alongside other ecosystem services) in an effort to enhance or create new networks of urban green space (Scott *et al.*, 2016). Although high-level “aspirational” goals advancing health-promoting environments, such as Habitat III, are welcome, as Barton (2010, p. 97) argues:

it is all too easy for beleaguered planners under pressure from all kinds of legitimate interests to see new objectives of “mental health” or “combating obesity” as yet more rods for their backs. Understandably, professional planners can take a jaundiced view of the exponential growth of expectations placed on them by a society desperate to find solutions to intractable problems in the built environment.

In this context, this chapter contributes to synthesising the extensive evidence base to inform critical decisions around the design and provision of green space, demonstrating the health-promoting benefits of different types of green space attributes and how these can be enhanced through evidence-informed design.

3 Policy Context and Drivers

3.1 Introduction

This chapter aims to provide an understanding of the policy context that supports the integration of green space provision, spatial planning and public health policy. The purpose of this analysis is to assess the manner in which national, regional and local policy in Ireland has recognised the potential of green space to contribute to population health and well-being and to identify the types of policies that *drive* current practices and will influence the future provision of green space. It does so by first identifying key international policies that frame national policy development, focusing on the UN's SDGs and Habitat III priorities. The chapter will then examine recent shifts in health policy, which increasingly emphasises a “whole-system” approach towards creating a healthier society, exemplified by Healthy Ireland and the implementation of a national programme of Healthy Cities and Counties. We then focus on the role of spatial planning in delivering healthier places, particularly examining the NPF and planning guidelines and highlighting some good practice from the case study local authorities. This is followed by a brief assessment of key initiatives to support health-promoting environments at the landscape scale, within the rural environment.

3.2 International Policy Context

Across the globe, policymakers are increasingly exploring the links between the built environment and public health as concerns rise about the impacts of built environments on health outcomes and healthy lifestyles. In response to the identified health benefits, high-level policy frameworks and guidance documents have increasingly promoted the creation of

health-supporting environments through the increased provision of green space (see, for example, WHO, 2010, 2012, 2013; UNGA, 2015). Two of the most notable of these global policies are the UN's SDGs (UN, 2016) and the UN's Habitat III – A New Urban Agenda (UNGA, 2015).

UN's Sustainable Development Goals	UN's HABITAT III New Urban Agenda
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The UN's SDGs were adopted in 2016 by 170 countries, including Ireland. In total, 17 SDGs, each with its own targets for 2030, are identified as having a transformative impact on global development. Within an Irish context, the Department of Communications, Climate Action and Environment has published a National Implementation Plan 2018–2020 (DCCAE, 2018) as a direct response to the publication of the SDGs, with a key aim of mainstreaming SDGs within national policymaking and ensuring policy alignment. SDG 11: Sustainable cities and communities specifically focuses on making cities inclusive, safe, resilient and sustainable, and identifies access to green spaces as a key target and an essential component of enhancing the sustainability of urban living – see Figure 3.1.

Habitat III, the UN's New Urban Agenda was declared in October 2016, in the wake of the adoption of the SDGs. The New Urban Agenda identifies the improvement of human health and well-being as a key priority urban goal. Signatories to the agenda committed to the promotion of a safe, healthy, inclusive and secure environment in cities and human settlements, specifically highlighting the importance of the creation and maintenance of well-connected and well-distributed networks of green spaces to improve

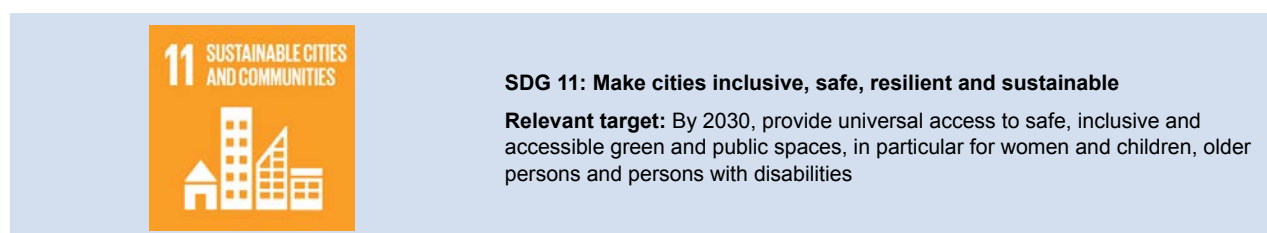


Figure 3.1. SDG 11 Make cities inclusive, safe, resilient and sustainable (UN, 2015).

Box 3.1. A New Urban Agenda and multifunctional green spaces

We commit to promote safe, inclusive, accessible, green, and quality public spaces, including streets, sidewalks, and cycling lanes, squares, waterfront areas, gardens, and parks that are multifunctional areas for social interaction and inclusion, human health and well-being, economic exchange, and cultural expression and dialogue among a wide diversity of people and cultures, and which are designed and managed to ensure human development, to build peaceful, inclusive, and participatory societies, as well as to promote living together, connectivity, and social inclusion (extract from Habitat III, A New Urban Agenda; UN, 2016: 6).

physical and mental health, social inclusion and social interactions and urban liveability and to enhance resilience to environmental risks (Box 3.1).

Similarly, from a health perspective, WHO has also been promoting green spaces as an essential element of sustainable urban development. For example, in its recent report, *Urban Green Spaces: A Brief for Action* (WHO, 2017), WHO contends that urban green spaces are an essential investment that local authorities can make to enhance citizen well-being, outlining that local authorities should maximise the multifunctional benefits of green spaces as follows (p. 2):

- urban residents have adequate opportunities for exposure to nature;
- urban biodiversity is maintained and protected;
- environmental hazards such as air pollution or noise are reduced;
- the impacts of extreme weather events (heatwaves, extreme rainfall or flooding) are mitigated;
- the quality of urban living is enhanced;
- the health and well-being of residents is improved.

3.3 Towards a “Whole-system” Approach to Health: Insights from Healthy Ireland

The seminal definition of health as set out by WHO (1946) is as follows:

Health is not merely the absence of disease and infirmity but a state of optimal physical, mental and social well-being.

This definition implies that promoting and supporting a healthier society moves beyond a one-dimensional focus on health service provision (i.e. treating people in ill health) towards addressing the wider social and

environmental determinants of health, and therefore emphasising well-being, quality of life and pathways towards a healthier lifestyle. This multidimensional approach towards health and well-being requires a *whole-system approach*, which recognises that an individual's health is affected by all aspects of their life: economic status, education, housing and the physical environment in which people live and work. Moreover, health and well-being are also affected by policy decisions taken by government, the individual choices that people make about how they live and the participation of people in their communities.

3.3.1 Sustainable development policy in Ireland

Irish public policy has increasingly shifted towards this whole-system approach to health and well-being, with both sustainable development policy and health policy recognising the interlinkages and need for collaboration across policy silos. In the wake of the national and international economic crisis of 2007/2008, public policy in Ireland has focused on the national recovery and restoring economic competitiveness and, more recently, significant emphasis has been given to addressing the multifaceted housing crisis and increasing housing supply in the context of a tentative economic recovery. However, notable policy initiatives can be identified that provide a framework for the further integration of health, green infrastructure and spatial planning.

In June 2012, the government published *Our Sustainable Future: A Framework for Sustainable Development for Ireland* (DECLG, 2012). This document was Ireland's main contribution to the Rio+20 conference on sustainable development which took place that year. The document reaffirmed

a commitment to the sustainable development agenda, acknowledging that, during the economic downturn (2007–2012), government priorities moved away from issues of sustainability and quality of life, focusing almost exclusively on economic recovery. The framework contained 12 key challenges for sustainable development, two of which were “social inclusion, sustainable communities and spatial planning” and “public health”. The document stated that:

an overarching goal of sustainable development is to improve overall quality of life ... [and that] ... sustainable communities will be key mechanisms to enhance our social capital and wellbeing (DECLG, 2012, p. 63).

The framework made a commitment to protect and enhance Ireland’s green infrastructure,⁶ which it defined as a “network of green spaces that help conserve natural ecosystems and provide benefit to human populations through, for example, water purification, flood control, food production and recreation” (Government of Ireland, p. 23). The document also committed to developing a “Health and Wellbeing Framework” (p. 73) to address lifestyle issues, including how best to encourage behavioural change in support of healthy living. In doing so, it recognised that adverse trends in obesity, diet, exercise and other risk factors mean that the level of chronic health conditions will increase in Ireland, in conjunction with an ageing population. Significantly, the built environment and lifestyle were identified as important social determinants of health. Indeed, the framework linked poorer health outcomes with lower incomes, poorer education, poorer housing and, crucially, “less-healthy environments with access to poorer services or amenities” (p. 75). More specifically, the document stated that:

a healthy environment is inextricably linked to the health of our population ... Amenities such as forest parks provide opportunities for recreation and add to our understanding of the environment thus supporting healthier lifestyles while contributing to our well-being (p. 75).

In addition to identifying key drivers of ill health, the framework recognises the need for policy co-operation

across government departments to address these challenges:

It must be recognised that wider determinants of health are influenced by policies across a range of Government Departments and inter-Departmental, cross-sectoral cooperation is necessary to improve the health of the population and to reduce health inequalities (p. 75).

3.3.2 *Healthy Ireland*

Following through on the commitment in *Our Sustainable Future* to develop a health and well-being framework, *Healthy Ireland: A Framework for Improved Health and Wellbeing 2013–2025* (Government of Ireland, 2013) was launched in 2013. Overseen by the Department of Health and the HSE, this policy framework is built around the achievement of four key goals. Goal 1 is to increase the proportion of people who are healthy at all stages of life. In addition to health status, weight, obesity, physical activity and mental well-being, the framework identifies broader determinants of health, including social connectedness or the availability of and access to green spaces. Goal 2 is to reduce health inequalities across Irish society. In addition to recognising the need for interventions to target particular health risks, the framework once again acknowledges the need to address the wider social determinants of health:

the circumstances in which people are born, grow, live, work and age – to create economic, social, cultural and physical environments that foster healthy living (Government of Ireland, 2013, p. 7).

Goal 3 is to protect the public from threats to health and well-being and Goal 4 is to create an environment in which every individual and sector of society can “play their part in achieving a healthy Ireland” (p. 7). The document identifies the need for society-wide involvement in, and engagement with, health and well-being promotion and improvement activities – from individuals making positive lifestyle choices and projects run by community and local groups to policy and legislative changes at the highest level of government.

⁶ It included woodlands, coastlines, flood plains, inland lakes and rivers, hedgerows and city parks as examples of such infrastructure.

A supplementary document to the Healthy Ireland planning framework, Healthy Ireland, Get Ireland Active (Government of Ireland, 2016), specifically calls on national and local government to ensure that the planning, development and design of towns and cities promotes the development of local and regional parks and recreational spaces that encourage physical activity (p. 24). This demonstrates the recognition among policymakers in the Department of Health and the HSE of a link between exercise in green spaces and improved physical health. The nature and design specifications of “spaces that encourage physical activity” are not set out, but their acknowledgement is an important milestone in national policy for health and well-being.

3.3.3 Healthy Cities and Counties

The Healthy Cities concept has been promoted across the globe by the WHO for over 30 years and now encompasses some 100 flagship cities,

1400 municipalities and around 30 national networks. The Healthy Cities approach is defined as a *process*, not an outcome, that is, a healthy city is not one that has achieved a particular health status, but rather a city that is conscious of health and is working to enhance health and well-being regardless of its current health status. The WHO Healthy Cities programme focuses on facilitating community-based health-enhancing initiatives, emphasising the importance of multisectoral approaches to addressing health in urban settings (Hall *et al.*, 2010). Successful implementation of this approach requires innovative action addressing all aspects of health and living conditions. As such, it aims to place health high on the agenda of political decision-makers and key stakeholders within a city’s health and social systems, as well as creating awareness of health among the broader population. WHO’s Healthy Cities Network has organised its activities into six phases since its inception, with each phase focusing on advancing a different theme, as outlined in Box 3.2.

Box 3.2. WHO’s Healthy Cities Network

Phase VI: 2014–2018

This [phase] gives priority to *life course approaches* in city policies and plans, with a focus on: early child development; ageing and vulnerability; tackling major public health challenges such as physical inactivity, obesity, tobacco, alcohol and mental health difficulties; strengthening people-centred health systems; and fostering resilient communities.

Phase V: 2009–2013

Priority was given to health and health equity in all policies, which, as in other phases, recognizes that population health is largely determined by policies and actions outside the health sector. The phase was built on previous city health development planning and focused on 3 core themes: caring and supportive environments, healthy living and healthy urban design.

Phase IV: 2003–2008

Participation in phase IV required an overall commitment to health development with an emphasis on equity, tackling the determinants of health, sustainable development, and participatory and democratic governance. Cities committed to working on healthy ageing, healthy urban planning, healthy impact assessment and active living.

Phase III: 1998–2002

This phase marked the transition from health promotion to integrated city health development plans. Cities created partnership-based policies, with a strong emphasis on equity, the social determinants of health, community development and regeneration initiatives. Cities were required to take systematic approaches to monitoring and evaluation.

Phase II: 1993–1997

Cities advanced the healthy cities approach by developing healthy public policies and drawing up comprehensive city health plans focusing on equity and sustainable development.

Phase I: 1988–1992

This early phase focused on setting up structures, such as the national networks which could be used as a platform for change.

Source: <http://www.euro.who.int/en/health-topics/environment-and-health/urban-health/who-european-healthy-cities-network/phases-of-the-network> (accessed 8 August 2018) (*italics added for emphasis*).

The Healthy Cities ideals have been translated into an Irish context through the Healthy Cities and Counties of Ireland Network, launched in November 2016. Following the ethos of the wider Healthy Cities movement, the Irish network involves local authorities working to improve health and well-being through political commitment, working in partnership with local stakeholders and supporting innovative projects. As of November 2019, 19 cities and counties are members of the Healthy Cities and Counties of Ireland Network. In addition to following good practice emerging from the Healthy Cities programme, the Healthy Cities and Counties approach in Ireland is also a key vehicle for mobilising the Healthy Ireland strategy at a local level, further recognising that many of the determinants of health are outside the influence of health policy, therefore requiring a co-ordinated and collaborative approach across agencies and new ways of working and engaging with public–private–community sectors.

As part of the Eco-Health project, semi-structured in-depth interviews were undertaken with 10 key informants within the Healthy Cities and Counties of Ireland Network. Although the work of the network is at an early stage of development, a number of key themes emerged from the interviews:

- Healthy Cities and Counties co-ordinators follow the ethos of the WHO Healthy Cities programme in framing Healthy Cities and Counties status as a process rather than an outcome.
- The local co-ordinators seek to build collaborative working relationships, both on an inter-agency basis and with local community groups. This involves decentralising action to very local scales and forging collaborative “problem-solving” to effect wider change at a local level. Local

co-ordinators, in effect, act as local champions for Healthy Ireland, raising awareness and seeking to engage local stakeholders on the benefits of a “whole-system” approach to health. In some examples, work has focused on building institutional capacity through developing new structures or formal working relationships. In other cases, building capacity has focused on demonstrating “credibility” of approach, developing mutually beneficial projects to illustrate its value to multiple agencies, and cultivating contacts with elected representatives, local community groups and local authority decision-makers.

- An important first step in the Healthy Cities and Counties approach is to develop a shared understanding of the local context and the social and environmental determinants of health, providing a local evidence base.
- Although the Healthy Cities and Counties approach is tailored to local circumstances, the value of local co-ordinators networking within Ireland and also Europe was viewed as key to sharing good practice and successful policy transfer.
- Limitations identified in the interviews include the tendency for siloed thinking among local agencies and within local authorities (across various departments); ongoing austerity conditions, including the loss of key staff (and institutional memory) and a lack of capacity; limited knowledge among a wide cohort of elected representatives; and lack of formal training.
- Future opportunities identified included further development of integrative policy tools, such as integrating Health Impact Assessments (HIAs) and Environmental Assessments; capacity

building training, particularly within senior management; and enhancing the evidence base for policymaking.

- The interviews with key informants suggested an awareness of the benefits of green space for health; however, this theme has not featured as a major part of local projects to date. There is significant potential to develop local collaborations between Healthy Cities and Counties approaches and local authority parks departments and planning departments to develop mutual working relationships on maximising the health potential of existing and new green assets.

The development of the Healthy Cities and Counties approach in Ireland is a significant development in advancing integrative policymaking and new ways of working towards building healthier places. Positively, this approach allows decision-making and prioritising of initiatives to be decentralised and devolved to a local scale, enabling local empowerment and bottom-up perspectives to be incorporated into addressing health issues. However, there is further potential in developing not only *local* responses but also *spatial* approaches towards addressing the social and environmental determinants of health, that is, through explicitly addressing the role of the natural and built environment in influencing health and well-being. Developing enhanced linkages between Healthy Cities and Counties ideas and spatial planning provides a mutually reinforcing approach that would further embed health as central to how we plan and manage urban and rural settlements and further link people development with place development. The next section examines how health and well-being is framed within spatial planning policies and practices in Ireland.

3.4 Making Healthier Places: The Role of Spatial Planning in Enhancing Health Benefits of Green Spaces

As recorded by Barton (2005, 2009, 2010) and Lawrence (2005), health and land use planning are historically interlinked, with the origins of the early planning movement in the late 19th century rooted in concerns over public health and slum conditions in Europe's rapidly industrialising cities. However, planning practice in the mid- to late 20th century

moved away from its public health origins, focusing primarily on economic development agendas. Indeed, during this period, Barton *et al.* (2009, p. i91) note how planning policies have "facilitated if not actually fostered the powerful trends towards car-dependent, sedentary and privatized lifestyles, with their negative effects on health". Barton *et al.* (2009) continue their critique, suggesting that many of the urban and development trends promoted by the market and facilitated by planning authorities are "pandering to our unhealthy instincts" (p. i92), leading to obesogenic environments (Townsend and Lake, 2017) that hinder the integration of physical activity into daily routines and diminish the psychological well-being arising from contact with the natural world. These trends have also been evident in the Irish context, with growing urban sprawl and dispersed development, land use segregation and car-based developments such as out-of-town retail and office parks: "unsustainability is literally being built into our environment" (Barton *et al.*, 2009, p. i92).

However, at the beginning of the 21st century there has been a renewed interest in the relationship between spatial planning and "health and well-being". In part, this reflects the re-scoping of planning from a narrow focus on land use regulation to broader notions of *spatial* planning (see, for example, Nadin, 2007; Stead and Meijers, 2009; Haughton *et al.*, 2010; Morphet, 2010; Clifford, 2013). Within this context, spatial planning is increasingly viewed as a co-ordinator, integrator and mediator of the spatial dimensions of wider policy streams: "the focus is thus now with addressing the factors that influence the nature and functioning of the places we live in and what is referred to as their liveability" (Manchester and Sheffield, 2008). As Shaw and Lord (2007) argue, this implies a clear aspiration to create better places within an integrative policy approach, which encourages interest in a broader set of spatial planning outcomes beyond a primary focus on land allocation towards a concern with quality of life, liveability and sustainable development (Nadin, 2007). Thus, planning frameworks are increasingly viewing individual and community health as central to SDGs (UN-Habitat, 2009), placing the enhancement of quality of life as a measure of success of place-making strategies (Crawford, 2010). In this section, we provide a brief overview of the Irish planning system and chart

evolving conceptions of health and green space within the planning policy framework. We then examine the 2018 NPF as a key departure point for future policy development and also highlight some good practice examples from three local authority case studies.

3.4.1 Overview of the Irish planning system

From 2000 onwards, the Irish spatial planning system has been completely modernised with a series of legislative changes, the introduction of multilevel spatial planning (including new national and regional planning frameworks) and the development of new planning guidelines and tools to address new development and sustainability challenges. Many of these changes reflected the growing economy experienced since the mid-1990s and the rapidly increasing housing supply, until the financial crisis of 2007/2008. The current system has been largely shaped by the Local Government (Planning and Development) Act 2000, which modernised the original system of planning in the face of rapid economic and physical development during the so-called Celtic Tiger era. The 2000 Act put in place a system that was based on the ethos of sustainable development (broadly conceived) and that was more strategic in scope, covering national, regional and local levels (Lennon *et al.*, 2018). The key components of the three-tiered system now in operation in Ireland are summarised in Table 3.1, which shows the various levels and the key planning instruments therein. The purpose of the planning system is set out in the non-statutory *Planning Policy Statement* (DECLG, 2015, p. 1), which identifies that the central role of planning is to ensure that “the right development

takes place in the right locations and at the right time and in providing the social, economic and physical infrastructure necessary to meet the needs of our people in a way that protects the many qualities of our natural and built environment”.

Planning policy and legislation is overseen at the national level by the Minister for Housing, Planning and Local Government and the Department of Housing, Planning and Local Government. The former National Spatial Strategy (DOELG, 2002) and the current NPF provide the overarching spatial planning framework for the country. The Minister can direct local authorities to take on board the policies contained in the NPF or in Regional Spatial and Economic Strategies. In this respect the Minister can intervene and directly shape policy at lower levels of the planning system.

Eight Regional Authorities were responsible for translating the National Spatial Strategy into regional planning guidelines covering the period 2004–2016 and 2010–2022. However, in 2015, the Regional Authorities were replaced by three Regional Assemblies – in both cases, these regional bodies are not directly elected, but members are appointed by the constituent local authorities from their elected councillors. The Regional Assemblies are currently drafting new Regional Spatial and Economic Strategies to provide a long-term regional-level strategic planning and economic framework in support of the implementation of the NPF. The NPF has included a provision for the preparation of Metropolitan Area Strategic Plans for each of the five cities and these will also be drafted by the Regional Assemblies in conjunction with the respective local authorities.

Table 3.1. The Irish planning system

Level	Organisation	Planning instruments
National	Minister for Housing, Planning and Local Government (Department of Housing, Planning and Local Government)	NPF: Project Ireland 2040
	An Bord Pleanála – Planning Appeals Board	Ministerial planning guidelines (over 30 sets of guidelines)
Regional	Three Regional Assemblies established on 1 January 2015	Regional Spatial and Economic Strategies (due to be adopted in early 2019)
	Replaced the eight Regional Authorities and two Regional Assemblies	Metropolitan Area Strategic Plans (for five cities)
		Regional planning guidelines
Local	Planning authorities (31 city or county councils)	City or county development plans
		Local area plans

The day-to-day regulation and management of development is carried out by local planning authorities, based in Ireland's 31 city and county councils. The two key planning instruments at local level are, first, the statutory development plans for cities and counties, which are the key planning frameworks at the local level and which indicate through zoning the types of development that are permissible in an area, and, second, the more fine-grained local area plans (LAPs), which operate between the general objectives of the development plan and individual proposals at a local level. LAPs must be made in respect of towns that have a population of over 5000. However, it is at the discretion of local authorities to prepare a LAP for any area that they consider suitable or when the planning authority feels that an area will require economic, physical and social renewal and for areas that are likely to be subject to considerable development. City or county development plans and LAPs must be consistent with the Regional Spatial and Economic Strategies.

The right to develop is consequent on an application being lodged and considered in the context of the relevant development plan and national planning guidance. Although land is zoned for different uses, each individual planning application is dealt with on its merits. In addition, in the Irish system provision is made for both first- and third-party appeals, whereby individuals and interested parties have the right to appeal to an independent Planning Appeals Board (An Bord Pleanála) against the granting or refusal of planning permission for any new development (for a detailed discussion of third-party appeals, see Ellis, 2002).

Although the Irish planning system is primarily focused on economic development and enabling an appropriate housing supply, over the last 15 years policymakers have increasingly been highlighting the importance of enhancing place quality and improved residential design, including the role of green space in creating more sustainable communities through an effective planning process. Table 3.2 summarises some key planning documents over the last 15 years and highlights how these policies have conceived of the relationship between enhancing urban liveability and green space provision.

3.4.2 Embedding green infrastructure into Irish planning policy and practice

Perhaps more fundamentally, recent years have also witnessed the repositioning of green space provision within the wider concept of green infrastructure within Irish planning frameworks. A green infrastructure approach to spatial planning and urban/landscape design moves beyond traditional site-based approaches of "protect and preserve" landscapes and green spaces towards a more holistic approach that acknowledges the complexities of social–ecological interactions. In this context, Scott *et al.* (2016) define green infrastructure as an interconnected network of multi-functional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities and wildlife. Therefore, in contrast to traditional planning approaches, green infrastructure planning includes not only protecting landscapes and green spaces but also enhancing, restoring, creating and designing new ecological networks based on maximising the capture of ecosystem services and benefits – these services are summarised in Table 3.3. Fundamental to this perspective is that green infrastructure provides multifunctional benefits – including health and well-being benefits – suggesting that green infrastructure networks should be *designed and managed* as multifunctional spaces, for example an urban green space may be designed to aid local drainage management, provide a habitat for wildlife and biodiversity, mitigate the urban heat island effect, mitigate local noise and air pollution and provide a space for recreation and social interaction.

Scott *et al.* (2016) provide a full account of the emergence of green infrastructure within Irish spatial planning within the EPA STRIVE project, *Eco-Plan – Integrating Ecosystem Approaches, Green Infrastructure and Spatial Planning*.⁷ In summary, an evolving interpretation of green infrastructure within Irish planning strategies may be divided into three broad phases, namely 2002–2007, 2008–2009, and 2010–present, each of which is summarised below:

1. *First phase: early to mid-2000s (2002–2007) – networked approaches.* Between 2002 and 2007, the development of green infrastructure planning

⁷ The full report can be downloaded at <http://www.epa.ie/pubs/reports/research/biodiversity/research188.html> (accessed 21 November 2019).

Table 3.2. The evolving framing of green space in housing and planning policy

Document	Details
Department of the Environment, Heritage and Local Government (2002) – <i>National Spatial Strategy</i> (NSS) (DOELG, 2002)	Adopted in November 2002, the NSS outlined a 20-year NPF for Ireland. The NSS emphasised the need for more compact and higher density urban development. Parks and green spaces were highlighted as important for urban quality of life, but were framed within the context of maintaining the economic competitiveness of Ireland through attracting mobile capital. The NSS proposed a “green structure” approach for the consolidation and strengthening of cities and towns. Although acknowledging recreation as an associated benefit, this approach did not explicitly recognise the potential health benefits of green space
National Economic and Social Council (NESC) (2004) – <i>Housing in Ireland: Performance and Policy</i> (NESC, 2004)	This report outlined a range of “local-level” characteristics that it considered essential to the sustainable neighbourhood. Reflecting the emphasis on compact, design-led approaches in the creation of sustainable neighbourhoods, as contained in the NSS, this report identified a specific range of characteristics that it determined should characterise new residential developments. This included “high-amenity green spaces”, but the characteristics – or indeed functions or benefits – of such spaces were not identified
Department of the Environment, Heritage and Local Government (2007) – <i>Delivering Homes, Sustaining Communities and Quality Housing for Sustainable Communities</i> (DEHLG, 2007)	This statement on housing policy emphasised the importance of quality of life issues, focusing on design, density, the integration of housing strategies, schools and crèche provision, leisure and recreational facilities, health care, community facilities and the enrichment of communities and places. However, it made no specific reference to green infrastructure, green space or “healthy living environments”. The accompanying best practice guidelines, <i>Quality Housing for Sustainable Communities</i> , for the first time provided detailed design guidance for the construction of housing in Ireland. The document identified green spaces as a fundamental component of the “urban framework” (p. 22), with parks and playing fields identified as key recreation and leisure facilities; however, no specific design guidance was provided
Department of the Environment, Heritage and Local Government (2009) – <i>Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (Cities, Towns and Villages)</i> (DEHLG, 2009a)	The guidelines advise that the effective integration of green spaces and parks into the overall planning and design process can contribute significantly to achieving high-quality places. Furthermore, the potential amenity, health and quality of life benefits of public open space were acknowledged: “Public open space can have a positive impact on physical and mental well being as it provides spaces to meet, interact, exercise and relax. It needs to be appropriately designed, properly located and well maintained to encourage its use. It is one of the key elements in defining the quality of the residential environment. Apart from the direct provision of active and passive recreation, it adds to the sense of identity of a neighbourhood, helps create a community spirit, and can improve the image of an area (especially a regeneration area). Well-designed open space is even more important in higher density residential developments” (p. 31)
Department of the Environment, Heritage and Local Government (2009) – <i>The Urban Design Manual: A Best Practice Guide</i> (DEHLG, 2009b)	The <i>Urban Design Manual</i> is a complementary document to the above guidelines that focuses on design principles to create more sustainable communities. In relation to green space, it highlighted the need for the positioning and creation of safe parks and green spaces close to people’s homes, recognising their social and community function: “parks, squares and greens can serve a vital community function and should be provided in a way that defines them clearly as accessible public space. So they should not be located at the foot of apartment buildings, inside cul-de-sacs or in any other area which may be perceived to be private” (p. 59). Although representing a considerable development in planning policy and design guidance, the document did not consider health and well-being benefits from green space beyond “safety and overlooking”. This suggests that potential health and well-being benefits of such guidance may not have been considered in the development of specific policy aims or objectives
Department of the Environment, Community and Local Government (2015) – <i>Planning Policy Statement</i> (DECLG, 2015)	This brief document sets out the overarching vision for planning in Ireland. The statement recognised that the development of sustainable communities characterised by high-quality urban design and a well-managed landscape and natural environment is of benefit to the quality of life of urban and rural residents. Furthermore, the document recognises the potential of good design to encourage a more active lifestyle, particularly in terms of travel and transport

was characterised by “networked approaches to green space policy”. This included the emergence in 2002 of an “ecological network” approach that prioritised the conservation of habitats and green mapping exercises in some local authorities. The popularity of this approach appears to have persisted until 2005, when it was overtaken by a “green network” concept, which emphasised multifunctionality in the planning and management of natural heritage. Discernible between 2005 and

2008 was the continued and increased focus on land use multifunctionality, while also extending the established “green network” policy discourse to dissolve traditional perspectives on the incommensurability of ecological conservation and anthropocentric land use.

2. *Second phase: late 2000s (2008–2009) – green infrastructure’s emergence.* By early 2008, new planning policy initiatives concerning green

Table 3.3. Ecosystem services of green infrastructure

Sample ecosystem services benefits of green infrastructure	Summary description
Drainage management	Managing the flow of surface and/or subsurface water through biomimicry, which uses less energy-intensive and expensive engineering solutions than those traditionally employed
Habitat provision	Establishing suitable areas and environmental conditions for individual organisms and ecological communities to thrive
Ecological connectivity	Creating functionally contiguous land and water habitats that facilitate the multiscale connectedness of ecological processes (e.g. species dispersal, nutrient transfer, hydro-ecological flow)
Landscape conservation and management	Managing ecological processes, land uses and social–ecological interactions that define and associate a mosaic of areas across a broad scale. It involves balancing habitat provision and ecological connectivity (see above) with sustainable social and economic patterns of use
Health, well-being and community development	Promoting positive individual and communal physical, psychological and social conditions. This entails fulfilling and enhancing a range of different needs, including basic requirements (food and energy), developmental necessities (outdoor education and community development opportunities) and growth facilitation (contact with nature)
Recreational space (provision and access)	Providing ease of access to a variety of different types of recreational space, including formal public gardens, natural and semi-natural spaces (woodlands, meadows, remediated quarries), outdoor sports facilities (playing fields, walking tracks) and community gardens/allotments
Sustainable transport (route provision and access)	Ensuring access for all to infrastructure that responds to current needs and accommodates future demand, yet does not endanger public health or ecological integrity
Climate change (mitigation and adaptation)	Facilitating forms of planning and designing that achieve a desired state by remaining responsive to both short-term and longer term changes in environmental conditions
Economic development	Supporting sustained and sustainable forms of growth that improve standards of living

space management had sought to integrate biodiversity conservation with recreational space provision. Coinciding with this was the rising popularity of the ecosystem services paradigm, which helped promote and establish new perspectives on conservation policy that increasingly viewed elements of the natural and semi-natural environment as “ecological assets” (DEHLG, 2008).

3. *Third phase: 2010s–present – institutionalisation and ongoing evolution.* The period from 2009 to the present has seen a considerable expansion in the spatial and functional applicability of a green infrastructure approach. Almost all spatial typographies, including brownfield sites and cultural heritage locations, are now considered as potential elements of green infrastructure. Simultaneously, the functions of green infrastructure have been expanded to include economic development and alignment with smart economy objectives. By the end of 2011, green infrastructure had achieved representation in guidance at national, regional and local levels, while also enjoying reference in many non-statutory planning policy documents. However, with the exception of Galway City

Council, the most comprehensive representation of green infrastructure was in the Greater Dublin Area and, more specifically, within the local authorities comprising the Dublin metropolitan region. This eastern and urban bias continued through 2012 and into 2013. Although a number of rural local authorities now seek to promote green infrastructure (e.g. Meath County Council, 2013; Monaghan County Council, 2013), much of this represents an extension of traditional modes of ecological conservation via “ecological networks”, rather than a focus on enhancing the multifunctional potential of lands. Nevertheless, recent initiatives by an increasing array of local authorities (see section 3.4.4) exemplify proactive and pioneering green infrastructure approaches that sensitively cater for urban growth while concurrently enhancing ecological integrity. Moreover, this third phase has also seen an increasing awareness that a green infrastructure approach can help planning authorities meet a wide range of environmental obligations under a series of EU directives, including the SEA Directive (2001/42/EC), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives and the Floods Directive (2007/60/EC).

The various phases in the evolution of green infrastructure into Irish spatial planning practice and the implications for integrating an ecosystems approach into spatial planning are outlined in Table 3.4.

3.4.3 The current national and regional planning context

The NPF was launched in February 2018 as the government's high-level strategic plan for shaping future growth and development to 2040. The NPF is a region-focused strategy, placing emphasis on creating more compact urban settlements to counter past failures to address decentralised growth and urban sprawl. Section 1.3 of the NPF outlines 10 national strategic outcomes, which if delivered

will create "shared benefits" (p. 14) across the country (DHPLG, 2018). These include compact growth; enhanced regional accessibility; strengthened regional economies and communities; sustainable mobility; a strong economy supported by enterprise, innovation and skills; high-quality international connectivity; enhanced amenities and heritage; transition to a low-carbon and climate-resilient society; sustainable management of water, waste and other environmental resources; and access to quality childcare, education and health services. Of specific relevance to promoting green space is National Strategic Outcome 7 on enhanced amenities and heritage (p. 15), which highlights the role of urban green space in enhancing local quality of life and the aspiration to create amenity-based green networks (Box 3.3).

Table 3.4. Evolution of green infrastructure in Irish spatial planning practice

Time frame	Green infrastructure as:	Key focus
Early 2000s	Ecological networks	- Ecological corridors - Linking habitats
	Green structure	- Urban growth management - Strategic greenbelts
Mid-2000s	Green linkages	Amenity purposes
	A green network or greenways	- Protection of natural heritage areas - Provision of green space for recreation
	Green chains or networks	- Multifunctionality - Proactive biodiversity enhancement
Late 2000s	Multifunctional networks	Network of multifunctional land uses serving social and ecological requirements
	Spatial connectivity	- Landscape scale perspective - Multiscalar
2010s	Essential infrastructure	Incorporating above plus: - Promoting resilience and adaptation - Environmental risk management (e.g. flood risk)

Box 3.3. National Strategic Outcome 7: enhanced amenities and heritage

This will ensure that our cities, towns and villages are attractive and can offer a good quality of life. It will require investment in well-designed public realm, which includes public spaces, parks and streets, as well as recreational infrastructure. It also includes amenities in rural areas, such as national and forest parks, activity-based tourism and trails such as greenways, blueways and peatways. This is linked to and must integrate with our built, cultural and natural heritage, which has intrinsic value in defining the character of urban and rural areas and adding to their attractiveness and sense of place.

These strategic outcomes are further elaborated through targets as a means of delivery. For example, to achieve more compact urban form, a target of 40% of all new housing is to be delivered within existing built-up areas. Similarly, to accomplish a greater regional balance, the strategy calls for more concentrated growth through a series of proportional targets, such as 50% of future national growth to be concentrated in Ireland's five largest cities. This represents a significant challenge and opportunity for green space provision – as our cities grow rapidly, and grow as more compact, higher density places, international good practice indicates that providing high-quality public spaces, green spaces and green space networks is an essential component of enhancing urban quality of life and well-being. This also suggests that not all brownfield sites should be viewed as “sites awaiting development”, as currently vacant land may provide essential ecosystem services to urban communities, including health and well-being benefits. Therefore, enhancing urban liveability and quality of life is central to delivering more compact urban development (p. 28). This is reflected in the plan's National Policy Objective 4: “ensure the creation of attractive, liveable, well designed, high quality urban places that are home to diverse and integrated communities that enjoy a high quality of life and well-being” (p. 55).

Chapters 6 and 9 of the NPF address key themes relating to health/well-being and green spaces. Chapter 6 sets out the NPF's goals around people, place and communities. Section 6.1 explores the role of planning in enhancing quality of life, recognising that “how future development in Ireland is planned will

continue to be a significant determinant of people's quality of life” (p. 81). Within this context, the NPF outlines how the quality of people's immediate environment plays a significant role in enhancing or influencing well-being. This theme is further elaborated in section 6.2 on healthy communities, which is underpinned by an understanding of the environmental and social determinants of health. Mirroring Healthy Ireland, the NPF states that:

Our health and our environment are inextricably linked. Specific health risks that can be influenced by spatial planning include heart disease, respiratory disease, mental health, obesity and injuries. *By taking a whole-system approach* to addressing the many factors that impact on health and wellbeing and which contribute to health inequalities, and by empowering and enabling individuals and communities to make healthier choices, it will be possible to improve health outcomes, particularly for the next generation of citizens (p. 82; italics added for emphasis).

This approach is consolidated by National Policy Objectives 26 and 27 (p. 82) (Box 3.4).

Within the context of health and well-being, the NPF recognises diverse needs across the life course relating to green space provision and design (section 6.4, Age Friendly Communities). For example, the NPF outlines the importance of enabling people to age comfortably in their own communities and that new developments should be lifetime adaptable for an ageing society. This includes ensuring enhanced provision, accessibility and design of green spaces

Box 3.4. National Policy Objectives 26 and 27

National Policy Objective 26

Support the objectives of public health policy including Healthy Ireland and the National Physical Activity Plan, through integrating such policies, where appropriate and at the applicable scale, with planning policy.

National Policy Objective 27

Ensure the integration of safe and convenient alternatives to the car into the design of our communities, by prioritizing walking and cycling accessibility to both existing and proposed developments, and integrating physical activity facilities for all ages.

and parks, connected with accessible walking routes and located close to where people live (p. 86). Similarly, the NPF addresses the green space needs of younger cohorts:

The number of people aged 15 or under will continue to increase until the early 2020's and decline only slowly thereafter. This means that the continued provision and enhancement of facilities and amenities for children and young people, such as childcare, schools, *playgrounds, parks and sportsgrounds*, remains necessary and will need to be maintained at similar levels for the foreseeable future thereafter (p. 88; italics added for emphasis).

- flood risk management – through a green infrastructure approach to Sustainable Urban Drainage Schemes (SUDS) to create safe places (p. 124);
- recreation and amenity – green spaces as essential to community recreation and amenities (p. 128);
- air pollution – the careful planning of green spaces is important to provide a nature-based solution to remove pollutants from the air and better manage urban micro-climates (p. 128);
- noise pollution – green spaces as an element of Noise Action Plans (e.g. green spaces as “noise barriers”) and valuing and protecting the role of green spaces as providing essential “quiet areas” in cities that enhance local quality of life (p. 129).

Chapter 9 outlines the NPF's environmental and sustainability objectives. Within this chapter, a green infrastructure approach is highlighted as being essential to achieving more sustainable development, with multifunctional benefits related to:

- natural capital protection – protecting and valuing important and vulnerable habitats, landscapes, natural heritage and green spaces (p. 117);
- climate action – as part of a green adaptation strategy approach that seeks to use ecological services to enhance resilience in the face of climate change, such as the creation of green spaces and parks to enable better management of urban micro-climates (p. 120);

Specific green infrastructure principles and objectives are set out on p. 125 of the NPF and are highlighted in Box 3.5.

In relation to implementing the NPF's objectives, there has clearly been some reflection on the difficulties associated with the previous National Spatial Strategy and its alignment or co-ordination with regional and county/city development plans. In summary, the key instruments for advancing the NPF include:

- New Regional Spatial and Economic Strategies to provide a long-term regional-level strategic planning and economic framework in support of the implementation of the NPF. These are

Box 3.5. National Policy Objective 58

Integrated planning for Green Infrastructure and ecosystem services will be incorporated into the preparation of statutory land use plans.

Green infrastructure planning will inform the preparation of regional and metropolitan strategies and city and county development plans by:

- assisting in accommodating growth and expansion, while retaining the intrinsic value of natural places and natural assets;
- providing increased certainty in planning by proactively addressing relevant environmental issues;
- encouraging more collaborative approaches to plan-making by enabling examination of the interactions between future development requirements and the capacity of receiving areas;
- ensuring that sufficient and well planned green spaces, commensurate in scale to long-term development requirements, are designated in statutory plans.

currently under preparation. The NPF has included a provision for the preparation of Metropolitan Area Strategic Plans for each of the five cities and these will also be drafted by the Regional Assemblies in conjunction with the respective local authorities.

- Alignment between the NPF and the government's 10-year National Development Plan (Government of Ireland, 2018). This thereby links sectoral infrastructural investments with a spatial planning framework in setting out the government's spending commitments for the next decade. In this way, it is anticipated by the document's authors that this will move the NPF beyond an aspirational vision to a framework underpinned by infrastructural commitments and investments that boost regional development.
- Establishment of an independent Office of the Planning Regulator to ensure alignment between the NPF, regional strategies and city/county development plans and to oversee the effective monitoring of the NPF's objectives.

3.4.4 Insights from local authority case studies

As outlined in Chapter 1, the Eco-Health project selected three local authorities for undertaking multimethod fieldwork: South Dublin County Council, Waterford City and County Council and Offaly County Council. As part of this, the relevant county development plans were examined to identify current priorities for green space and health issues. Within all of the counties examined, an increased use of quality of life, health and well-being as overarching planning goals was evident. Moreover, green infrastructure has moved centre stage within the local authority County development plans as a key means to capture multifunctional benefits (including health benefits) of green space networks, enabling each local authority to take a much more strategic (rather than reactive or defensive) approach to green infrastructure planning. In the remainder of this section, we outline the current state of play within the three local authority areas regarding green infrastructure and well-being issues, providing some wider insights into how planning policies and practice at a local level are addressing health and well-being through green infrastructure planning.

South Dublin County Council

Green infrastructure constitutes key elements of the current and previous development plans for South Dublin, demonstrating the utility of the concept to deliver multifunctional benefits at local authority scale. For example, the 2010–2016 development plan made reference to green infrastructure, and more specifically, the development of:

a strategy for the creation of a Green Infrastructure for the County, promoting a balance between the protection of areas zoned Liffey Valley or high amenity, the facilitation of recreational use, and the provision of a network of sustainable wildlife corridors throughout the County (SDCC, 2010, p. 246).

Particular emphasis was placed on the development of recreational “green routes” for walking and cycling and *green structure* approaches, as set out in the National Spatial Strategy. The document identified the presence of “green links” with “healthy environments”, making specific reference to “green networks”, “green corridors” and hierarchies of regional, district, neighbourhood and pocket parks being rolled out as part of a green routes programme. In this way, the multifunctional services provided by green infrastructure were recognised, ranging from biodiversity protection to quality of life benefits:

Green infrastructure is a strategically planned and delivered network of high quality green spaces and other environmental features. It should be designed and managed as a multifunctional resource capable of delivering a wide range of environmental and quality of life benefits for local communities. Green infrastructure includes parks, open spaces, playing fields, woodlands and allotments and private gardens (SDCC, 2010, p. 257).

Building on the 2010–2016 development plan, the current development plan (2016–2022) (SDCC, 2016) identifies quality of life and the promotion of health and well-being as an overarching policy goal. In progressing the green infrastructure focus of the previous plan, an entire chapter (Chapter 8) is dedicated to green infrastructure. In so doing, green infrastructure is identified as a core planning

focus, rather than a supporting concept. In addition to reiterating the key aspects of the preceding policy, the current policy recognises “the health and quality of life of residents and visitors” through amenity and recreation space provision as a service provided by green infrastructure (p. 142). Significantly, the plan identifies strategic green infrastructure planning as a means to assist in meeting statutory obligations under EU directives and national legislation and outlines a range of specific objectives to achieve this. Crucially, moving beyond the previous plan, the plan recognises the potential benefits of a green infrastructure approach in urban areas for human health, beyond the “quality of life” benefits of recreation:

The benefits of a Green Infrastructure approach in urban areas includes the greening of our urban areas, the creation of attractive open spaces, better health and human well-being and local distinctiveness (p. 149).

In so doing, the current development plan for South Dublin has recognised a wider range of functionality provided by ecosystems and, more specifically, green space and green infrastructure. The provision of safe and accessible green networks and linkages is promoted. What it does not do, however, is provide specific design guidance for the development of green spaces and green infrastructure, which will potentially improve the health and well-being of the population.

Green infrastructure has emerged as an important consideration for local policy in South Dublin. Evidence of this is clear in the policies that have emerged and developed over the past decade. A clear progression can be identified between the previous and the current development plans, with green infrastructure developing from a peripheral concept to an increasingly central focus for policymaking. LAPs that emerged during the life of the 2010–2016 development plan are consistent with the development plan in terms of green infrastructure planning. Policy innovations in the current development plan and in LAPs adopted since 2012 generally suggest a growing understanding of the multifunctional potential of the green infrastructure planning approach, not least in terms of population well-being. Health benefits are increasingly being recognised and the current trajectory of policy development suggests the need

for the development of evidence-informed policy objectives and guidance for improving population health with green infrastructure.

Waterford City and County Council

Waterford City Council and Waterford County Council merged in June 2014 to become Waterford City and County Council. The current development plans – in addition to the Dungarvan Town Council Plan – predate this merger. As such, separate development plans remain in force for each administrative area. No unified plan has been developed.

Adopted in 2011, the Waterford County Development Plan (Waterford City and County Council, 2011) states, inter alia, as its vision:

To develop Waterford as a County, where the wellbeing of the community is enhanced ... as we strive to become a Green County (p. i).

In so doing, population well-being and a “green” focus are to the fore. Green belt zones are identified to limit urban sprawl, and the promotion of walking and cycling – particularly for tourism – is a central focus. A number of strategic walking/amenity trails are identified as having tourism potential:

- the disused railway line between Dungarvan and Waterford city (discussed further below);
- the Munster Way (which connects with the Avondhu Way in East Cork and the Tipperary Heritage Trail in South Tipperary).

With a view to enabling Waterford to become the “walking capital of Ireland”, a Recreational Trails Committee was established within the council. This committee consists of representatives from the key stakeholders in the area of trails development “to co-ordinate the development, upgrade and promotion of trails” (p. 67). Waterford County Council, in conjunction with the Waterford Sports Partnership, local cycling groups and community volunteers, have actively promoted cycling in the county through the organisation of an annual cycling tour event, the Sean Kelly Tour (since 2007); this has recently been replaced by the Comeragh Tour.

Green infrastructure is recognised in the plan as an important concept in land use planning and environmental protection and is understood to provide

“environmental, social, economic and physical benefits and give added value where integrated in the development process” (p. 122). However, although the multifunctions of green infrastructure are broadly recognised, the focus of the policy is firmly on biodiversity. Health promotion is very much linked with alternative and generally unrelated policies for walking and cycling infrastructure.

The Waterford City Development Plan (2013–2019) (Waterford City and County Council, 2012a) was adopted a year after the Waterford County Development Plan. Written in the context of Waterford's WHO Healthy City status, the retention of its healthy city status was identified as a primary policy objective (POL 1.1.14 and OBJ 2.1.18). The quality of both the built and the natural environment is recognised within the plan as “crucial assets for the city and its citizens” in terms of healthy living (p. 13). The walking and cycling strategy aims to maximise dedicated provision for pedestrians and cyclists, with improved open space provision being linked with modal shift:

Provision of open space areas, and recreational and sporting facilities in close proximity to higher residential areas can also encourage greater modal shift to non car modes (p. 87).

The provision of green routes is identified as a means to improve accessibility and amenity:

The green routes are currently being implemented along the South Quays which will further enhance the pedestrian environment here, providing for better connectivity between the quayside and the shopping area (p. 68). ... Significant progress has been made in improving City Centre accessibility recently, particularly given the implementation of the green routes (p. 73).

Linked open spaces, the provision of pedestrian and cycle “greenways” to link neighbourhoods and the creation of strategic “green wedges” to provide, inter alia, opportunities for active and passive recreation are included as objectives. Green infrastructure is referred to only in the context of biodiversity protection and enhancement, but the definition employed suggests that benefits to humans are recognised:

Green infrastructure is defined as the interconnected network of green space that conserves natural ecosystem values providing benefits for both habitat and human populations (p. 146).

Although the benefits of green infrastructure are recognised, they are not identified as priority outcomes. Objective 10.4.11 of the plan is “to support the green infrastructure concept in development proposals where feasible” (p. 152). “Where feasible” implies a discretionary approach and, ultimately, the green infrastructure concept is largely employed in the Waterford City Development Plan in the context of biodiversity, rather than for the achievement of wider benefits.

In addition to the city and county development plans, the town of Dungarvan also has a Council Plan (Waterford City and County Council, 2012b). Published in 2012 and running until 2018, this plan has a strong focus on walking, cycling and tourism, linking closely with strategic walking/amenity trails identified in the county development plan. Emphasising and reflecting the disconnect identified between green infrastructure policies and policies for walking and cycling identified in the city and county development plans, there is no specific reference to green infrastructure in the Dungarvan Town Council Plan. Policies and objectives are invariably drawn directly from the Waterford County Development Plan.

In summary, increased recognition of the multifunctional value of green infrastructure has emerged in Waterford City and County Council. However, the emphasis of this value remains firmly linked with biodiversity rather than broader health and well-being benefits. Policies for walking and cycling form a central part of policy across the plans; however, these are not integrated with green infrastructure strategies for the most part. The development of walking and cycling routes clearly feeds into a green infrastructure approach in urban, rural and suburban contexts. The challenge here is to identify evidence-informed policy options that reflect more broadly on the health and well-being benefits of green space, green routes and green infrastructure as solutions to economic, social and environmental challenges across various population and social cohorts.

Offaly County Council

Offaly County Council has three development plan areas: Offaly County; Tullamore Town and Environs; and Birr Town and Environs. In addition to the development plans for these areas, there are two LAPs: Portarlinton Joint LAP and Edenderry LAP. The current county development plan came into effect in 2014 whereas the two town development plans date from 2010 (both extended to 2020). The LAPs date from 2011 (Edenderry) and 2012 (Portarlinton). As such, all four plans other than the current county development plan were developed under the previous county development plan (2009–2015).

The 2009 county development plan included “a good quality of life” as a core aspiration for the people of Offaly (Offaly County Council, 2009). The policy recognised that there are “components of the environment which sustain health and well-being” (p. 24). However, within the document, such components are limited to air and water quality. The publication of the current county development plan in 2014 (Offaly County Council, 2014) represented a significant development with regard to policy for green space in County Offaly. The term “green infrastructure” was included and an entire section of the policy is dedicated to green infrastructure as a comprehensive strategy and planning approach:

Green Infrastructure ... should be designed and managed as a multifunctional resource capable of delivering a wide range of economic, environmental and quality of life benefits for local communities including inter alia:

- Attracting businesses and inward investment by creating an attractive environment;
- More places for people to access nature, outdoor recreation and for social interaction;
- Local food production – in allotments, gardens and through agriculture;
- Encouraging physical activity and improved health and well-being by providing quality green spaces for walking and cycling and other physical activity (p. 157).

In terms of the green infrastructure strategy, it is clear that the principles of a green infrastructure approach to land use planning have been embedded as a cross-cutting theme in the policies and objectives of this development plan. Furthermore, it is an objective of the Council to develop and support the implementation of a Green Infrastructure Strategy, in accordance with international best practice and emerging national guidance, subject to the availability of resources.

Recognising the need for cross-sectoral co-operation in the delivery of green infrastructure, it is an objective of the Council to develop and support the implementation of green infrastructure by working with chief stakeholders, including Bord na Móna, the National Parks and Wildlife Service (NPWS), Coillte, Waterways Ireland and farmers, community groups and NGOs, where appropriate (p. 159). The protection of potential “greenway” routes along and in proximity to abandoned railway lines from inappropriate development that could compromise the delivery of cycling or walking routes in the future is enshrined in the policy (p. 174).

Referring specifically to urban developments within the county, the 2014 plan states that existing green infrastructure should be identified at the initial stages of the planning process for development and should guide the design of an appropriate site layout. According to the plan, green infrastructure may comprise linear open spaces along paths, watercourses and planting or other natural features and may provide opportunities for walking and cycling, informal recreation, and biodiversity and wildlife migration. It requires that a landscaping plan should be submitted with an application that should clearly illustrate how existing green infrastructure, and opportunities to create more linkages outside the site, have informed and been incorporated into the development, layout and, if appropriate, management proposals. What it does not do, however, is provide any specific guidance on the desirable characteristics of such green infrastructure and how its use can be maximised and by whom.

The Tullamore Town and Environs Development Plan 2010–2016 (Offaly County Council, 2010a), although predating the current county development plan, places a strong emphasis on the role of green spaces to provide “corridor opportunities” for walking and cycling. It is a policy of the plan to:

Ensure that pedestrian movements are catered for through the provision of conventional roadside footpaths, greenways (linking open spaces directly and providing alternative routes) and innovative urban spaces (Chapter 5, p. 5).

The plan states that:

The opportunity exists to extend the existing green corridor from the Town Park to create a new riverside linear park that could ultimately connect from the town centre to Charleville Demesne. This linear park would be informal in nature, with areas that widen out to create parks large enough for informal play and recreation (Chapter 5, p. 27).

In so doing, the plan has given a clear consideration to the “nature” and potential attributes of such a corridor. The plan identifies the potential of the town to develop as a “green cycle/transport town”. It identifies the following opportunities for different cohorts/users in the development of a cycle network in the town and environs:

- residents – the opportunity for a healthier lifestyle;
- investors – an attractive place to do businesses;
- tourists – an exciting way to see the built heritage of the town and environs.

In line with a green infrastructure approach to planning and development, the Tullamore Public Realm Strategy involves the further development and extension of the network of interlinked parks and green spaces within the town and environs. Access to, and permeability within, this network of green and blue (river and canal) space is considered of key importance to pedestrians and cyclists.

The final development plan in Offaly is the Birr Town and Environs Development Plan 2010–2016 (extended until 2020) (Offaly County Council, 2010b). A strategic objective of this plan is:

To preserve, enhance, identify and secure new road, pedestrian, cycleway and green corridor linkages between and among residential areas, the River Camcor linear parkland, the town centre and existing and planned roads (p. 8).

Area-based strategies identify such opportunities in the various neighbourhoods in the town. Furthermore, the Public Realm Plan includes specific objectives to further integrate open spaces into the existing built environment of the town, make public squares and streets more people friendly and improve the appearance of approach roads to Birr town and Crinkle village (Chapter 5, p. 1).

The plan sets out strategies for the improvement and development of a hierarchy of open spaces, both formal and informal, that are linked and “comfortably” accessible to all residents. Furthermore, the plan identifies the need to consider different types of green spaces and how they should be planned:

- public parks and public walkways (formal/passive);
- playing spaces/sports (active/informal);
- pedestrian linkages/permeability and accessibility;
- walking routes/heritage trail;
- cycleways;
- landscaping, planting, trees and greenery.

The plan identifies the importance of the quality and design of green spaces, suggesting that they should be provided in accordance with the principles of the *2009 Guidelines on Sustainable Residential Development in Urban Areas* (DEHLG, 2009a) and accompanying *Urban Design Manual* (DEHLG, 2009b). Beyond this, a range of policies is set out to provide pedestrian linkages, permeability and accessibility throughout the town and its environs.

These policies are supported by wide-ranging and specific policy objectives. As in Tullamore, the Council recognises Birr as a “green cycle/transport town”. Finally, the plan recognises the need to consider different population groups in the planning and management of the town:

It is important to ensure that relevant services are provided for across these age-cohorts including employment opportunities, childcare facilities, retirement homes, public parks, etc. (Chapter 2, p. 1).

Although recognising the need to cater for different population groups and recognising the different types and hierarchies of spaces, the plan does not provide specific design guidelines to facilitate population health and well-being. Although the term “green infrastructure” is not used anywhere in the document,

the Birr policy employs a green infrastructure approach to planning in all but name. The challenge now is to identify the wider functions and benefits supplied by green infrastructure to all population cohorts and to reflect this in policy.

The publication of the current county development plan in 2014 represented an important turning point with regard to the establishment of a green infrastructure planning approach in County Offaly. However, the development of a green infrastructure-type focus was clearly in train before this within the county. The Tullamore Town and Environs Development Plan, published in 2010, placed a strong emphasis on the role of green spaces to provide “corridor opportunities” for walking and cycling. Similarly, the 2010 Birr Town and Environs Development Plan employed a green infrastructure approach to planning in all but name. The health-promoting benefits of green infrastructure are not directly considered by either plan, highlighting a clear policy deficit based on the existing evidence. Despite this, policy innovation is clearly evident at the development plan level.

3.5 Nature, Health and the Rural Environment

Although studies of rural quality of life in Ireland (e.g. Brereton *et al.*, 2011) have demonstrated the importance of the rural environment (e.g. open space, scenic landscapes, tranquillity) in contributing to enhanced well-being and life satisfaction, one of the paradoxes of rural living is that, although rural residents are surrounded by green space, this is often inaccessible agricultural land and the provision of accessible green space can be very limited. In comparison to the UK, rights of access across the Irish countryside are much less developed, while the provision of green spaces is much more limited in smaller settlements. Indeed, our interviews with key policy informants highlighted some of the challenges within rural Ireland to ensure that accessible green spaces are linked to wider well-being objectives:

I suppose the tendency is that in the rural areas, people think, oh yeah sure, it's beautiful, like there's all the open space. And that it's all greenery and it is. But it does need some infrastructure by way of just enabling, like cycleways (interview with Healthy Cities and Counties co-ordinator).

I'd nearly consider that urban living provides more facilities for activity and exercise and health opportunities, but that you could argue that air quality in rural areas is better ... [F]ootpaths [and walking] aren't necessarily safe in rural Ireland, so people have to drive to access, say a nearby beach or nice wooded area. I don't believe rural people have better access [to green spaces] (interview with Healthy Cities and Counties co-ordinator).

However, the evidence is clear on the restorative benefits of contact with nature and spatial justice considerations suggest that rural dwellers should also be able to avail of green space benefits. Furthermore, the geographies of rural Ireland and land ownership constraints suggest that alternative actions are required within rural contexts. For example, within one of our study areas in County Offaly, a new accessible recreation space has been provided through the recent development of a wind farm, whereby, in the mitigation of local impacts, a tract of previously private rural land has now been made public, hosting a local parkrun. In this section, two case studies are examined to illustrate the potential of using publicly owned land to boost the recreation and health potential of the rural environment and the emergence of greenways to provide linear green spaces within the rural environment, often aligned with disused railway lines or river/canal corridors.

3.5.1 Case study 1: the role of semi-state and public bodies

Reflecting the increasing awareness emerging in national policy of the potential benefits accruing to populations as a result of access to natural environments, a number of national semi-state and NGOs have developed policies and initiatives that consider green space–health interactions. For example, in 2005, the Irish Sports Council and Coillte (the national forestry service) commissioned a study entitled the Economic Value of Trails and Forest Recreation in the Republic of Ireland (Fitzpatrick Associates, 2005). The study recommended that:

Provision of new trails should take account of the varying requirements of individual trail users and the long-term issues of management and sustainability. The majority

of users require trail lengths that take between one and three hours to walk. International experiences show that the provision of different trail length and difficulty options from a common starting point has proved successful. New trails need not necessarily involve entirely new infrastructure, but should preferably build on existing facilities such as forests, parks, watersides etc. (p. 59).

This collaboration was recognition by sporting and environmental organisations (with responsibility for green and natural environments) that they can work together to provide spaces for sport and recreation with multiple benefits. The recommendation quoted above represents careful consideration of the infrastructural needs of different users. The study concluded that any investment plan will require close interaction between Coillte and other agencies, such as the NPWS and Waterways Ireland. Furthermore, the study identified the implementation of effective trail management structures (with appropriate financial support) involving a combination of local-level knowledge and manpower with specialist trail development expertise as being key to effective trail and path maintenance. It recommended the use of surveys to better understand the habits of green space users (not limited to forests and trails). The implementation of such surveys could be adapted to better assess “healthy” behaviours based on the growing body of research that links green space, health and well-being.

The findings from this study clearly influenced the development of the Coillte Recreation Policy, published 5 years later in 2010 (Coillte, 2010). The policy provides specifications for “easy grade” paths that are considered “suitable for all ages and fitness levels” as follows:

- On nearly flat ground with a gradient of no more than 8% and average of 5%. Tread width: 1.2m.
- They may also be wheelchair accessible to some degree.
- They should not take over 30 minutes for the average walker to complete.
- They should not include stiles and steps or other obstacles.
- The ground should be surfaced and well drained.

- A person wearing runners should not have difficulty with this walk.
- Hazards such as fallen branches must be removed immediately.
- Benches should be provided at 200-metre intervals.

Coillte has provided some further innovative and practical design guidance that has not been forthcoming in mainstream public policies. Adherence to such guidance is in line with the evidence relating to health, well-being and social benefits that can be derived from public green spaces and parks:

Consideration ... needs to be given to the development of wheelchair accessible picnic sites and BBQ areas. Barbequing has become increasingly popular in the last ten years with the advent of disposable barbeque sets. Facilities for these need to be included at picnic sites. Although we experience high rainfall, traditionally we have not provided wet weather picnic sites unlike providers in the UK, US and Europe. Consideration needs to be given to well-designed all-weather picnic sites (Coillte Recreation Policy, 2010, p. 23).

The Coillte Recreation Policy recognises the potential weakness of a universal design approach:

... given the nature of the terrain it is not possible to give access to all areas for all users. Recreation users have different capabilities and developing access to all areas would simply not be feasible or even desirable, as it will reduce other users experience and could have a negative impact on the environment. For example, if the company were to provide access for all to a mountain top viewpoint it would have to reduce gradients, pave the route etc., which could destroy the overall recreation experience for other users (Coillte Recreation Policy, 2010, p. 31).

The Coillte Recreation Policy sets out a comprehensive and user-focused approach to management. Although maintenance priorities are set out, functions beyond maintenance – from

public information to “risk management” and the provision of signage – are also prioritised. Such specific and practical design guidance that gives careful consideration to the needs of different kinds of users can potentially inform public policies to a greater extent.

More recently, an Outdoor Recreation Plan for Public Lands and Waters in Ireland 2017–2021 (Bord na Móna *et al.*, 2017) was published on behalf of five state bodies, comprising Bord na Móna, Coillte, Inland Fisheries Ireland, the NPWS and Waterways Ireland. The plan aims to provide a co-ordinated approach to recreation management and to evaluate its societal and economic benefits. The plan outlines that public bodies control or own around 15% of land in Ireland (concentrated in rural areas) and, in addition, regulate over 1000 km of inland waterways and watercourses. Although these public bodies do not have a primary remit for providing recreation, the plan recognises the opportunities and demands for enhancing recreational access. Significantly, the plan recognises the contribution that outdoor recreation can make to Healthy Ireland goals, through enhancing physical activity, providing mental health benefits through enhanced exposure and access to nature and “blue–green spaces”, and providing healthy outdoor recreation in all parts of the country.

3.5.2 Case study 2: developing a greenways strategy

In July 2018, the Department of Transport, Tourism and Sport (DTTS) published its *Strategy for the Future Development of National and Regional Greenways* (DTTS, 2018). The strategy follows on from objectives outlined in the NPF and National Development Plan in relation to developing national and regional greenways and enhancing amenities and heritage as a key national strategic outcome. Within the NPF, developing a greenway strategy was included as a key rural development objective, with a network of greenways framed as a key tourism asset. As the lead department, the DTTS emphasises the tourism potential of investing in greenways and their role in stimulating rural tourism. However, health and well-being benefits are also to the fore:

The Department of Transport, Tourism and Sport recognises the benefits that can arise from the further development of Greenways in Ireland, as a tourism product with significant potential to attract overseas visitors, for local communities in terms of economic benefits, and for all users as an amenity for physical activity and a contributor to health and wellbeing (DTTS, 2018, p. 5).

In this context, the strategy highlights its contribution to the National Physical Activity Plan for Ireland, through developing walking, cycling and physical activity infrastructure and by maximising physical activity and recreation amenities in the natural environment. The strategy defines greenways as “a recreational or pedestrian corridor for non-motorised journeys, developed in an integrated manner which enhances both the environment and quality of life of the surrounding area” (p. 7) and outlines that the strategy’s key objectives are to deliver (p. 6):

1. A Strategic Greenway network of national and regional routes, with a number of high capacity flagship routes that can be extended and/or link with local Greenways and other cycling and walking infrastructure;
2. Greenways of scale and appropriate standard that have significant potential to deliver an increase in activity tourism to Ireland and are regularly used by overseas visitors, domestic visitors and locals thereby contributing to a healthier society through increased physical activity;
3. Greenways that provide a substantially segregated off-road experience linking places of interest, recreation and leisure in areas with beautiful scenery of different types with plenty to see and do;
4. Greenways that provide opportunities for the development of local businesses and economies;
5. Greenways that are developed with all relevant stakeholders in line with an agreed code of practice.

The strategy and related funding call for investment are focused on national greenways, which are at least 100 km long, and regional greenways, which are at least 20 km in length but preferably closer to 40 km, or which can be extended to connect to a longer strategic route. Recognising that land rights are strongly protected in Ireland, the strategy outlines potential models for greenway development:

- The preferred model is to prepare greenways on land without disputed ownership issues or on state-controlled land, enabling unrestricted access and reducing liability for insurance. Examples include land owned by state agencies such as Coillte or disused railway lines.
- Permissive access: the majority of existing walking trail developments in Ireland have been established on a “permissive access” basis. Some greenways developed to date, most notably the Great Western Greenway, have been developed using the permissive access model in which the landowner (private or public) gives permission for the greenway/trail to pass over the property. Permissive access does not lead to a route becoming a right of way.
- Land purchase: it is anticipated that voluntary agreements could be entered into to sell the small sections of land required to construct a greenway. The strategy recognises, however, that there may be instances when a voluntary agreement cannot be reached with landowners or alternative routes are not possible. In such circumstances, and when

efforts to arrive at a mutually agreeable solution have been exhausted, purchase of land using the available legal mechanisms may need to be considered.

The strategy also outlines design standards for greenways, linkages with greenways in Northern Ireland, and branding issues. It is anticipated that the DTTS will announce a funding call for greenway projects for the period 2019–2021, with applications to be accepted from local authorities and state agencies only (and not through community-led proposals).

Although framed primarily as a tourism initiative, evidence from the Waterford Greenway suggests that new greenways are used extensively by locals with the explicit purpose of increasing activity and physical exercise (Box 3.6), suggesting that the new national and regional greenways will provide important health-promoting environments for local people in rural areas, as well as for visitors. Moreover, opportunities exist to link local greenways (smaller in scale) and cycleways into these national and regional routes, providing extensive networks of recreation spaces and opportunities for outdoor activity and enhancing restorative contact with nature.

3.6 Conclusion

As the economy continues to recover, it is now an opportune time to reflect on the type of environment

Box 3.6. Example: Waterford Greenway

The Waterford Greenway was officially opened to the public in March 2017 and, at 46 km, it is currently the longest greenway in Ireland. The off-road walking and cycling trail links Waterford city to Dungarvan, predominantly using the alignment of a disused railway line. Waterford City and County Council commissioned a baseline survey of greenway users in 2017 (1180 people were surveyed), providing a useful profile of users and also some of its potential benefits.

- Although promoted as a resource for tourism, 64% of users were from County Waterford, with 53% living in close proximity to the route, suggesting that investing in greenways provides a major outdoor recreation facility for local citizens.
- 58% of survey respondents visited the greenway at least once per month, with 43% visiting the greenway on a daily or weekly basis, again suggesting that local people benefit significantly from this resource.
- 53% of regular users stated that their primary purpose for visiting the greenway was for physical exercise (walking and/or cycling).

and places that we are creating to accommodate a growing (and ageing) population. This challenge is at the heart of the government's new NPF:

By 2040 there will be roughly an extra one million people living in our country. This population growth will require hundreds of thousands of new jobs and new homes. If we fail to plan for this growth and for the demands it will place on our built and natural environment, as well as on our social and economic fabric, then we will certainly fail in our responsibility to future generations of Irish men and Irish women. That responsibility is to ensure their prosperity and happiness in an ever changing world (p. 10).

In this context of a growing population and associated growth in house building, it is important to challenge the “business as usual” approach of developer-led urban sprawl, which has facilitated economic growth, and embed healthier lifestyles into the built and natural environments and centralise quality of life outcomes within future urban, regional and rural development.

In this way, we can link “place development” with “people development”.

This chapter has identified that, across the globe and within Ireland, policymakers have increasingly recognised the role that green space and green infrastructure can play in enhancing health, urban liveability and sustainability. A range of policy initiatives at global, national and local levels now provides important drivers for positive change, which provide a policy direction that must be translated into the local provision and design of green space and green infrastructure. These policy drivers are summarised in Box 3.7, providing a summary of “takeaways” for practitioners in the fields of health, planning, urban and landscape design, and managing green space. Nevertheless, this review suggested that, at local authority level, practitioners lack clear mechanisms for determining how to create context-sensitive responses to promote health and well-being initiatives that bridge embedded disciplinary silos and move beyond a reliance on high-cost (albeit successful) interventions, such as greenway construction.

Box 3.7. Summary takeaway for practitioners

- Green space provision can make an important contribution to implementing SDGs in Ireland and at local level. The SDG targets for making cities inclusive, safe, resilient and sustainable include enhancing green space provision as a means to creating healthier and more liveable urban places.
- The UN's Habitat III also highlights the importance of creating well-connected and well-distributed networks of green spaces to improve physical and mental health.
- WHO (2017) declares that urban green spaces are an essential investment that local authorities can make to enhance well-being.
- Ireland's has embraced a “whole-system approach” to health and well-being, emphasising the social and environmental determinants of health and well-being – therefore, effective green space and green infrastructure planning can contribute to the government's Healthy Ireland strategy.
- The Healthy Cities and Counties approach in Ireland offers much potential as an integrative approach to local policymaking. There is significant scope for co-ordinating with local planners and green space managers in developing green space projects within reinforcing health and environment objectives.
- Over the last 15 years, national planning and housing policy has increasingly recognised the role of green space networks in enhancing urban liveability and within place-making strategies. Specifically, urban green space provision should go hand-in-hand with policies promoting increased residential densities.
- Over the last decade, green infrastructure has emerged as a key local planning response to enhancing green space. This approach recognises the multifunctional benefits and services that green spaces and green infrastructure provide (e.g. health, recreation, biodiversity, flood alleviation). Although there are excellent examples of green infrastructure planning, there is further scope for embedding this approach within local authority development plans and development management throughout the country.

- The NPF includes the key national strategic outcome of enhancing amenities and heritage. This recognises the contribution of urban green space in enhancing local quality of life and creating amenity-based green networks.
- Section 6.2 (Healthy Communities) of the NPF reinforces a “whole-systems” approach to enhancing health and well-being, again emphasising that spatial plans must contribute to wider Healthy Ireland goals.
- Section 9 of the NPF promotes green infrastructure as a key concept for achieving more sustainable development. This approach can deliver multifunctional benefits with regard to the management of land use – the three local authority case studies also demonstrate how green infrastructure can be mobilised as a means of integrating local environmental priorities alongside health and well-being outcomes.
- Rural areas should not be overlooked in green space provision – recent initiatives have demonstrated the potential of utilising publicly owned land for enhancing recreation and for creating new greenways, blueways and peatways. The new strategy for national and regional greenways provides a welcome boost for enhancing greenway infrastructure. There is also the potential to link more local greenways and cycling/walking infrastructure to these national/regional routes.

4 The Research Approach: Developing an “Affordances” Framework for Planning and Design

4.1 Introduction

As discussed in Chapters 1 and 2, reviews of existing scientific research generally support the intuitive assertion that green spaces contribute positively to the physical and mental health of individuals (see, for example, Croucher *et al.*, 2007; Renalds *et al.*, 2010; Mensah *et al.*, 2016). Within this context, numerous studies have examined how the design of the public realm encourages people to be more physically active, if it contributes to improved health outcomes or if it attracts people to be more active (de Vries *et al.*, 2003; Ord *et al.*, 2013).

The majority of such studies have found that living in proximity to urban green space generally encourages increased levels of physical activity and positive health behaviours and improves health outcomes (Giles-Corti and Donovan, 2003; Ellaway *et al.*, 2005; Giles-Corti *et al.*, 2005; Kaczynski and Henderson, 2007; Tzoulas *et al.*, 2007; Sugiyama *et al.*, 2010; Gascon *et al.*, 2016). The greater part of this research remains focused on issues of “proximity” and objective measures of accessibility. This may be attributable to both the ease with which this can be quantified and the ways in which the dominant approach to green space provision have been normatively constituted as a matter of spatial equity grounded in an environmental justice paradigm.

The dominance of distribution and accessibility concerns has in turn stimulated a focus within planning policy and practice on the promotion of green space access standards as a means to translate positive correlations between green space proximity and health into implementable planning policy (Sallis *et al.*, 1998; Natural England, 2009, 2010; National Trails Office, 2012). However, such planning endeavours to frequently emphasise “equitable provision of access” at the expense of the “quality” of those green spaces accessed. When the issue of quality is given weight, this regularly focuses on the provision of features such as walkways, benches and sporting facilities selected from a menu of standardised interventions (Owens, 2002; Cohen *et al.*, 2006, 2009; Norman

et al., 2006; Abraham *et al.*, 2010; Goličnik and Thompson, 2010; Veitch *et al.*, 2012). Although some research has sought to address the deficit of attention allocated to “quality” in green space planning and design (CABE Space, 2005; Fuller *et al.*, 2007; Ward Thompson and Aspinall, 2011; Ward Thompson, 2014a), the general lack of emphasis given to this issue is an understandable phenomenon given that the concept of “quality” does not easily lend itself to the formulation of policy or design that is applicable across an administrative area of varying socio-economic and/or environmental attributes. Indeed, the principal difficulties with negotiating the concept of “quality” are that it is perceived as context specific and subjective, and thereby problematic for the formulation of policy at the municipal or county level.

In this chapter we propose that promoting healthier urban environments necessitates moving beyond a unifocal concern with equity in the spatial distribution of green spaces to the allocation of greater attention to the quality of those green spaces provided. However, limiting the effective provision of green space for health and well-being are difficulties in formulating broadly applicable concepts on what constitutes “quality”. Accordingly, what is required is a framework for conceptualising what quality may entail in the context of green space planning when applied at different sites and against the backdrop of different user desires. This framework needs to supply a means to complement the concept of “proximity” in enticing people to use green spaces and thereby enhance the potential health and well-being benefits of such areas.

This suggests the need to move beyond traditional environmental justice approaches focusing on the socio-spatial distribution of environmental goods to develop a more dynamic framework that integrates quality and “use-ability”, which embraces green spaces as multidimensional places with a broad array of potential uses. Consequently, the Eco-Health project advances the theory of “affordances” as a means to address this issue by demonstrating how it can be employed to develop a framework for conceptualising “quality” in the planning and design of green spaces.

4.2 Green Space, Design Attributes and Well-being

Given the widely espoused benefits of green space for health and well-being outlined in Chapter 2, it is unsurprising that research has increasingly viewed urban green space provision in terms of equitable and just planning outcomes. As recorded by Walker (2012), although environmental justice campaigns and literature have traditionally focused on opposition to the distribution of environmental “bads” (e.g. waste, pollution), green space represents one of the newer, and least explored, topics to be positioned within an environmental justice framework. The basis for including green space within environmental justice activism relates to its benefits and contributions towards quality of life, health and well-being, and it has become a topic for traditional socio-spatial distributional analysis (who lives near green space and who does not) (Agyeman *et al.*, 2003; Wolch *et al.*, 2014; Jennings *et al.*, 2016). These issues are heightened within an urban environment, where land is scarce and under pressure for development to maximise land values.

Thus, approaches to green space have generally been framed within a traditional Rawlsian perspective of justice, concerned with the distribution of environmental goods (spatial provision and proximity of green space) and procedural fairness in the distribution of environmental goods (the governance of green space and “rules” or standards producing green space outcomes) – in other words, how and what gets distributed. However, although much research highlights the health benefits of living close to green space, results are more complex. Indeed, naïve assumptions of simple cause and effect relationships are unhelpful from a planning perspective. For example, although there is recognition of the relationship between quality environments and health, there is a more limited understanding of mechanisms and of the cause and effect relationships. Where positive associations between physical activity and green space have been recorded, this has often varied by population cohort and studies have variously recommended further research regarding proximity (see, for example, de Vries *et al.*, 2003; Maas *et al.*, 2006; Gascon *et al.*, 2016) and the perceived quality or level of attractiveness of green space (Van Dyck *et al.*, 2011; Ord *et al.*, 2013). Furthermore, the existence of

green space in a locality does not always equate with a health-promoting environment. For example, within an urban context, perceptions of vandalism, safety concerns and poor design may undermine the use of green space (Walker, 2012). As such, it is clear that the “quality” of green spaces is at least as important as “quantity” and “proximity” in promoting physical activity.

Nonetheless, this often-neglected aspect of “quality” has gained increasing recognition through the growth in literature addressing the role of green space in psychological well-being. Studies in this vein have generally identified the positive effects of green areas on the self-reported mental health of residents (de Vries *et al.*, 2003; Guite *et al.*, 2006; Maas *et al.*, 2006; van den Berg *et al.*, 2010, 2016). Much work in this field advances an understanding of how exposure to nature provides feelings of “retreat” and assists in “restoring” mental functioning. The work of Rachel and Stephen Kaplan (1989) has been particularly influential in this context. They developed the “attention restoration theory”, which suggests that people exposed to high stimulus environments that require extended periods of “direct attention” suffer mental fatigue and a reduced attention span, which can in turn lead to reduced physical and mental functioning (Herzog *et al.*, 2003). The theory suggests that carefully designed environments can provide “restorative settings”, with specific qualities and components that are beneficial for restoring physical and mental capabilities (Ulrich and Addoms, 1981; Kaplan, 1995). These services may be particularly important within an urban context where exposure to stresses may be more acutely perceived (van den Berg *et al.*, 2010; Beyer *et al.*, 2014; Corkery, 2015).

As urban populations expand, the design and management of green spaces presents challenges to planners, designers and public health officials in providing health-promoting environments. However, promoting healthier urban environments necessitates moving beyond an over-riding concern with equity in the spatial distribution of green spaces and the allocation of greater attention to the quality of those green spaces provided. In this context, drawing on the work of Amartya Sen (1999), increasingly environmental justice literature is moving beyond simply a focus on distribution to examine how those distributions affect well-being and how we “function”. Instead, the emphasis is on “capabilities”

and individual agency, functioning and well-being to examine what environmental goods do for us rather than simply focusing on their distribution (Schlosberg, 2009). This line of reasoning reflects insightful research demonstrating that differences in age, gender, cultural background and educational status influence perceptions of green space, and thus the potential for people to engage with such spaces (Rishbeth, 2001; Jorgensen and Anthopoulou, 2007; Woolley, 2008; Tveit, 2009). In turn, this suggests that the planning and design of green space should focus not only on provision, accessibility and distribution, but also on design interventions that complement proximity by enticing people to use green spaces to enhance health and well-being through conceptualising user perceptions of green space “quality”. Consequently, the Eco-Health project advances the theory of “affordances” as a means to address this issue by demonstrating how it can be employed to develop a framework for conceptualising quality in the planning and design of green spaces.

4.3 The Concept of Affordances

Prevalent approaches to green space planning typically conceive environmental experience as comprising a linear process of causal effects between ontologically discrete entities. Here, the environment and the person are understood as two distinguishable and separate spheres, with attributes and happenings in the environment envisaged as producing particular mental states in the independent perceiver (Heft, 2010). In essence, the “perceiver” is envisaged as an “observer” rather than an active participant in the configuration of themselves and the environment in which they are positioned (Olwig, 2008; Anusas and Ingold, 2013). This observer status pervades thinking in planning, most notably in such planning tools as landscape character assessment and visual impact assessment, but also in terms of the design of public green space (Vouligny *et al.*, 2009). Here, environmental preference-based research implicitly assumes that providing increased exposure (Berto, 2005; van den Berg *et al.*, 2007; James *et al.*, 2015) or access (van den Berg *et al.*, 2010; Beyer *et al.*, 2014) to “greener” spaces supplies an appropriate approach to planning for health and well-being. Although such work has greatly increased our understanding of what needs to be considered in planning, this line of research is frequently more attribute descriptive

than conceptually informative, thereby limiting its ability to furnish a workable framework applicable to a spectrum of contexts. Specifically, it focuses on the preferences that people as “observers” may have for different attributes of an environment, without properly advancing a nuanced appreciation as to “why” these preferences exist (Thwaites and Simkins, 2006).

Gibson’s (1979) “ecological approach” to perception offers a potential correction to this deficit. At the heart of this approach is the idea that perception is an embodied and dynamic experience. From this position, organisms perceive a world of potentialities identified relative to the scale of their bodies, physiological capacities and temporal biophysical possibilities. Gibson (1979) used the term “affordances” to describe such potentialities, as he needed a new word that could capture the sense of “relativity” inherent to the concept. Affordances are thus the opportunities or constraints that exist within an environment relative to the characteristics of the organism perceiving them. Crucial to understanding this concept is that it advances a “relational” ontology in which “affordances are both real and perceivable but are not properties of either the environment or the animal” (Chemero, 2003, p. 181). As such, affordances “emerge” within the relationship between an organism and its environment. In this sense, “an affordance cuts across the dichotomy of subjective–objective and helps us to understand its inadequacy. It is equally a fact of the environment and a fact of behaviour” (Gibson, 1979, p. 129). To describe this relational phenomenon, Gibson frequently employed linguistic conjunctives formed by attaching the suffix “able” to a verb or phrase. For example, he described an apple once ripe as “eatable” or the surface at the edge of a cliff as “fall-off-able”. In terms of green space, Heft (2010, p. 19) illustrates the concept by describing a trail through a wooded area leading to a pond. Whereas the trail affords the opportunity for walking, the pond constrains this opportunity (albeit potentially affording alternative opportunities such as swimming, fishing or sailing toy boats).

4.3.1 *The affordance dimensions of green space*

Fundamental to understanding the affordance dimensions of green space is that all aspects of the emerging experience of such spaces are produced

in a relative and integrative fashion, such that no dimension exists as an a priori attribute. Nevertheless, as this emergent experience always exists in relation to a person, to fathom the form of the experience it is necessary to appreciate the characteristics of the person who is in the relationship with that green space (Miller *et al.*, 2014). It is thereby important to acknowledge that different people have different physical and psychological capacities, interests and needs that influence how they relate to their world (Rishbeth, 2001; Jorgensen and Anthopoulou, 2007; Woolley, 2008). Thus, to simply plan green space without respect for difference is to risk curtailing the potential health and well-being benefits of such spaces. For example, Ward Thompson (2007) has shown how various age groups experience parks differently, with children seeking to build dens, teenagers seeking spaces to hang out, young parents wanting places to socialise with each other as they observe their children safely playing and the elderly preferring traditional flower gardens with benches for rest. To this list could be added the needs of dog walkers, joggers, footballers, nature watchers and a host of other potential green space users (Chiesura, 2004; Temple *et al.*, 2011).

However, given the relational nature of the affordances concept, it is not simply the needs that must be considered, but the emergent relationships between the configuration of the green space and its use. For example, whereas some adolescents have been shown to seek out green spaces that offer opportunities for active recreation in natural settings (Van Hecke *et al.*, 2016), other adolescents desiring independence from adult supervision seek opportunities for “retreat” and furtive peer socialisation (Lieberg, 1995) through using landform to conceal themselves from observation (Townshend and Roberts, 2013). Scale is likewise an important attribute of green space configuration in the consideration of affordances; indeed, Sugiyama *et al.* (2010) correlated larger park size with enhanced attractiveness. With similar attention to scale, but in a different context, the detailed study of Copenhagen’s “pocket parks” by Peschardt *et al.* (2016) concluded that, whereas it is difficult for small green spaces to easily combine restoration with socialisation, a scalar arrangement might simultaneously facilitate such affordances through the subdivision of these parks into different “rooms” for distinctive uses. Attention to scale has also

been shown to influence affordances at the regional scale, whereby connecting a series of small parks into a broader green network increases the perceived opportunities for walking and cycling compared with what would otherwise exist (Little, 1990; Erickson, 2006).

Moreover, the emergent and dynamic nature of affordances means that they not only differ between people, but also differ with respect to the same person consequent on motivation, time and the effects of ageing, to name but some temporal possibilities. For example, Heft (1988) has shown how affordance relationships between children, actions and objects change over time. He notes that, although a young child might perceive a tree as a suitable location under which to construct a den, the same child might view that tree as an object for climbing once they grow old enough to physically reach its lower branches. Conversely, Bell *et al.* (2014) note how the perceived opportunities offered by green space may reduce consequent on the physical challenges of senescence. Cyclical time may also influence affordances. Indeed, most people can easily relate to how the obvious differences of night and day may completely alter perceptions of personal safety within a green space (Luymes and Tamminga, 1995), whereas seasonal variations may influence the intensity with which a green space is used, as a result of weather, appearance or surface conditions (Ulrich and Addoms, 1981).

Thus, a diversity of dimensions must be considered when studying the potential affordances between green space attributes and possible users. However, the challenge of accommodating such diversity presents an opportunity to coherently conceptualise what “quality” means in the context of green space planning. Specifically, employing the idea of affordances enables the conceptualisation of “quality” as the successful maximisation of the range of positive affordances experienced by the greatest spectrum of green space users without unduly reducing the positive affordances experienced by another. How to create “quality” environments that stimulate the emergence of such positive affordances thus requires a framework that coherently organises the multiple dimensions of potential green space affordances into a workable reference tool for planners and designers. Such a framework is presented in the following section.

4.3.2 *An affordances framework for green space*

The above review suggests that six dimensions interact in producing potential relations of opportunity and constraint. These are namely space (e.g. landforms), scale, time, objects (e.g. presence or absence of trees, benches, cycleways), actions (e.g. climbing, jogging, bird watching) and the physical and psychological state of the person positioned in relation to these other dimensions. Importantly, none of these dimensions exists independently of the others in producing the experience of “quality”. Rather, each dynamically inter-relates to continually constitute an ever-emerging relationality as the embodied perceiver interacts with the green space. Such interactions thereby continually recreate the perception of quality by profiling the potentialities and constraints of the environment for the person interacting with it.⁸ Hence, carefully considering the relationships between these dimensions offers planners and designers a conceptually informed means to negotiate context in fostering quality.

Nevertheless, locating a method to coherently and concisely convey the complexities of these relationships in a manner convenient for use is challenging. A number of options were explored by the authors, including, among others, tables, radial diagrams, phase diagrams and recursive and alternating flow charts, as well as stacked and radial Venn diagrams. However, consequent on the relational ontology of the affordances concept, none of these visual methods proved satisfactory in communicating the elaborate inter-relationships between perceivers and the affordance dimensions of green space. Therefore, it was concluded that a less conventional and more experimental mode of representation was required. Through this exploratory approach, a “star” pattern began to emerge by layering the various connections and intersections between perceivers and the affordance dimensions of green space. Thus, an “affordances star” was formulated as a visual heuristic to assist in the consideration of

these relationships (Figure 4.1). Although there are a modest number of useful “star diagrams” in the field of design studies, these are primarily concerned with supplying aids for the description and assessment of spatial characteristics (ownership, land uses, visual permeability, management, etc.) (Varna and Tiesdell, 2010), rather than with furnishing heuristics for exploring and deploying a relational ontological perspective on the experience of green spaces. Consequently, the affordances star answers calls to furnish designers with better ways of conceiving and responding to the dynamics of experience (Bell, 2014; Ward Thompson, 2014b) by helping to redress a deficit of thinking tools in this field. Furthermore, the affordances star has the benefit of non-specificity to a particular site, climate or user; instead, it presents a conceptual framework applicable across a range of contexts, thereby maximising its latent utility. Each point of the “star” references one of the affordance dimensions of green space. Accordingly, when taken together, the six points of the star constitute the green space “environment” as perceived by the person interacting with it. The “quality” of that environment, understood as the sense of potential positive affordances present, is dependent on the configuration of relationality between the different points of the star relative to the perceiver.

The star is constructed by inversely positioning two triangles. Thus, each point of the triangle is inherently related with the other two points on the triangle (e.g. actions–objects–persons). In addition, the line joining two points on one triangle intersects lines joining two points on the other triangle. This establishes a set of multiple relations. To illustrate this, the “quality” of the green space environment with respect to children can be partly considered. Beginning with the point “actions”, there are relationships on the same triangle with the points “persons” and “objects” that must be considered [e.g. the compatibility between children-specific attributes (persons), play area equipment (objects) and developmental play needs (actions)]. As the line between the point “actions” and “objects” crosses the line between the points “spaces” and

8 For example, in the case of an elderly person moving through a green space when walking, the affordances of that space may cyclically change as surface characteristics alter in different seasons: from an undulating wildflower-lined trail with birdsong in spring that affords connectivity between parks, to the same trail in winter that is muddy, slippery on slopes, lacks much border vegetation and experiences localised flooding that impedes access to other parks. This illustrates the relationality between person–actions–times–spaces–objects–scales. The particularities of this relationality may thus influence the person’s perception of the “quality” of that environment as a location for walking.

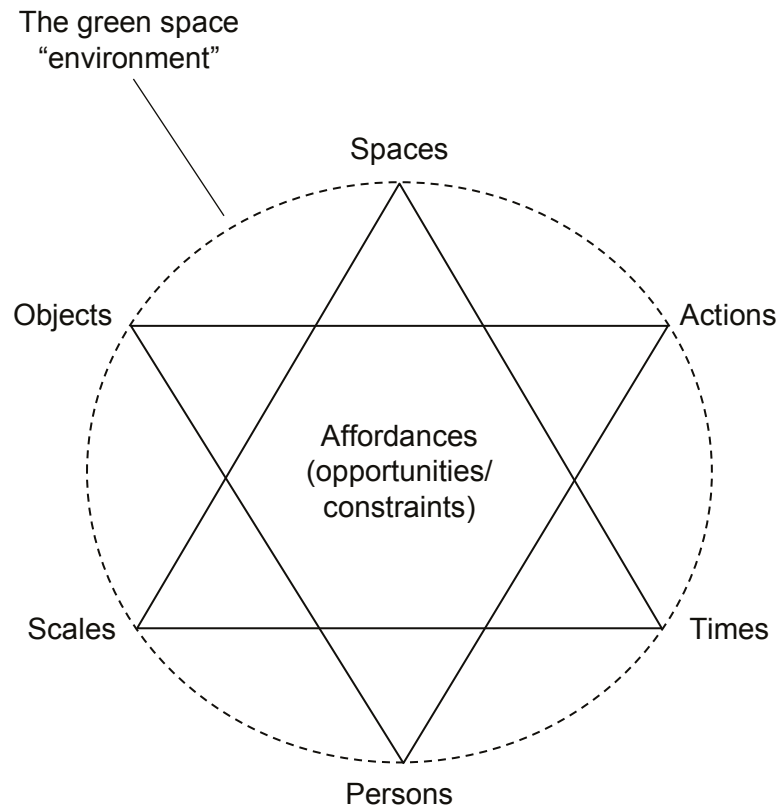


Figure 4.1. The “affordances star”: a relational framework for enhancing the quality of green space for health and well-being.

“times”, the relationships between actions–spaces, actions–times and actions–spaces–times–objects must also be considered. Thus, the following relationalities may be explored in the present example: Is the topography suitable for children’s play – are there any steep drops nearby? (actions–spaces); Is the play area supplied with lighting to facilitate late afternoon use in winter? (actions–times); Is the area suitable for year-round use as a children’s play space – does it flood, is it durable? (actions–spaces–times); Do nearby trees drop leaves onto the equipment, rendering them slippery and unsafe for use in autumn? (actions–spaces–times–objects). This process of exploring the multiple relationships between the different points of the star continues until all of the relationships between the points of the star have been considered.

In seeking to enhance the environmental quality of a green space, it is highly probable that different people or groups will approach the space from different perspectives. A potentially useful feature of the affordances star is that those seeking such enhancements can begin to use the star from their perspective. Thus, for example, a municipal planner seeking to create a network of parks can begin at

the “scale” point; a landscape architect seeking to (re)design a park can begin at the “spaces” or “objects” points; and a public health official seeking to promote the active use of green space can begin at the “actions” point. Similarly, a voluntary management committee or trust seeking to enhance the recreational or leisure potential of a green space may choose to begin at the “spaces”, “objects” or “actions” point, depending on the specific objectives for that space. Nevertheless, the relational questioning required in the operation of the star amplifies the potential for a range of positive affordances experienced by a greater spectrum of green space users than would likely be possible should each of these perspectives operate by employing the conventional non-relational ontological perspective on how green space is experienced. This is because, in using the star, the “scale”-concerned municipal planner would have to consider the multiple relationships with “spaces”, “objects” and “actions, in addition to considering the multifarious interactions with “persons” and “times”. Therefore, the affordances star supplies a practical, yet evidence-based conceptual framework that can be deployed as a tool in seeking to enhance the health and well-being “quality” of green spaces.

4.3.3 *An affordance framework for green space planning and design*

Conceiving the environment as a relational configuration of affordances means that engagement with the environment through actions such as walking, climbing and playing games represents an attempt to “actualise” the perceived affordances of that environment as a place appropriate for such activities. This attempt to actualise the affordances thereby generates an “experience”. At the heart of this experience is the degree to which the initially perceived affordances constituting a relationally configured environment are perceived as facilitated or inhibited. In this way, an attempt to actualise the perceived affordances of an environment is a *learning experience*, whereby the constituents of a specific relational configuration (objects, scale, spaces, times, etc.) prompt a greater understanding of the possibilities for future action (Michaels, 2003). Accordingly, this experience may supply an opportunity for deeper engagement with green spaces as a person’s confidence to engage with such spaces is enhanced. This may consequently increase both the array and the depth of affordances perceived to be available in these spaces. Hence, the potential to perceive a green space more favourably may increase as a person becomes more familiar with the use of it. This may thereby increase both the frequency with which a green space is used and the array of activities performed in such a space, thus enhancing the health and well-being benefits experienced.

Therefore, increasing the prominence of green space attributes that are likely to enhance their identification as an affordance relative to an array of users may (1) encourage the desire to actualise that affordance; (2) enhance confidence among potential users in the use of that green space; (3) prompt a greater frequency and range of uses of that green space; and (4) thereby enhance the potential of that green space to assist societal health and well-being (Withagen *et al.*, 2012).

The “affordances star” may assist the provision of positive “learning experiences” by helping those designing green spaces to investigate and respond to the potential relational configuration of the dimensions of embodied perception that prompt evaluations of the “quality” of such spaces. For example, in seeking to create a shared cycleway–walkway through a

green space that will encourage greater physical activity, the green space designer can employ the affordances star to explore the relationality between objects, scale, spaces and times. Here, “objects” such as finger posts/distance markers that regularly provide direction, and information boards displaying park maps, may be employed to supply orientation to the potential user and thereby stimulate confidence in their ability to knowledgeably navigate the green space. “Scalar” attention may prompt designers to create a series of looped routes of different distances, some of which may connect across parks and even into regional cycling and walking networks. Referencing this array of route options on the finger posts/distance markers and information boards would offer options to the potential user and enable them to progressively explore the route network as they gain confidence and fitness (objects–scales). Allocating attention to the “space” dimension could further enhance the learning experience. For example, investigating how best to integrate different landforms into the route to supply variety and challenge may be appropriate. These landform characteristics could then be described on the information boards and be related to different route options of different lengths and difficulty (objects–scales–spaces). Considering how different routes would appear at different times would also be an important design concern. The affordances star would prompt consideration of how different routes would appear at night, in different seasons and in different weather, thereby focusing attention on such issues as lighting and surface materials along the different route options (objects–scales–spaces–time).

Thus, the affordances star may be employed as a heuristic device for reflection in the design process when seeking to enhance and promote the health and well-being potential of green space by fostering positive learning experiences that entice people to engage with such spaces. Given the relational ontology advanced by the approach, operationalising this heuristic requires attention to the prospective users of these spaces. Accordingly, maximising the heuristic potential of the affordances star requires the formulation of a series of “model users” by the green space designer. To facilitate equity, this series of “model users” should embrace a life-course range that includes the spectrum of context-relevant ethnicities and physical abilities, as well as the different genders (male, female and transgender). This can be achieved

Table 4.1. Generalised “model user” matrix^a

Ethnic group ►		Ethnicity A				Ethnicity B				Ethnicity C				Ethnicity D			
Disability status ►																	
Life-course stage ^b ▼	Gender ▼	NI	MI	HI	VI	NI	MI	HI	VI	NI	MI	HI	VI	NI	MI	HI	VI
Childhood	Male																
	Female																
	Transgender																
Adolescence	Male																
	Female																
	Transgender																
Adulthood	Male																
	Female																
	Transgender																
Later life	Male																
	Female																
	Transgender																

^aFor illustrative purposes only. The specific composition of such a matrix should be sensitive to local socio-demographic characteristics.

^bRefer to Douglas *et al.* (2017) for a detailed description of a life-course approach to green space planning, design and management for health and well-being.

HI, hearing impaired; MI, mobility impaired; NI, no physical impairment; VI, visually impaired.

through the construction of a matrix that is sensitive to the socio-demographic particularities of the place within which the green space is situated. A generalised matrix is provided in Table 4.1 for illustrative purposes.⁹

In the context of seeking to enhance green space quality to attract users and thereby assist public health and well-being improvement, the capacities of the space to respond to the range of anticipated use desires by each model user may subsequently be explored by application of the affordances star. Hence, the perception of environmental quality ensuing from the interaction of various affordance dimensions (objects, scales, spaces, actions, times) may be hypothesised relative to a range of potential users. By cross-checking the various design intervention options flowing from the application of the affordances star to the model user matrix, designers can subsequently establish which intervention options are shared between the maximum number of hypothetical model users. In this way, designers can determine which

interventions to prioritise when seeking to enhance the attractiveness of green spaces for an array of potential users.¹⁰ Consequently, this affordances framework can help move the impetus of green space planning and design from the prevailing normative concern with distributional equity to a more nuanced focus on the relationally constituted “quality” of such environments. However, rather than denying the importance of green space proximity to public health, this refocusing seeks to complement such distributional concerns with attention to what draws people from various backgrounds to these spaces. Specifically, the emphasis on affordances advanced in this framework resets the agenda for green space planning from stressing parity of proximity to an interlacing of this concern with a distinct accent on the opportunities for rest, recreation and rejuvenation offered by such environments. It is in this sense that the affordances framework supplies the prospect of recalibrating the motivations of green space planning and design for

⁹ This matrix is provided as a generalised example of how such a matrix could be constructed. The specifics of the matrix would necessarily be dependent on the socio-demographic context in which the work is undertaken.

¹⁰ A cost–benefit analysis of these intervention options would also have to inform such prioritisation decisions to ensure maximum return on invested capital, time and effort.

health and well-being from a normative concern with the distribution of green space as an objective, yet vaguely defined “good”, to a reinterpretation of this “good” as the subjectively perceived opportunities afforded to the users of such spaces.

4.4 Operationalising the “Affordances” Approach in Eco-Health

Recent years have witnessed a wave of interest in understanding the environmental influences on human health and well-being, with a vast literature emerging that has significantly enhanced the evidence base and has provided a renewed interest in connecting planning for the built environment with health initiatives. With this growing knowledge base, planners and designers are tasked with translating this knowledge into spatial planning frameworks and design schemes. This chapter responds to an identified need to supply a conceptually informed framework for green space planning and design for health and well-being that moves beyond the prevalence of attribute-descriptive studies evident in the literature. Both theory and practice have tended to focus on the distribution and proximity of green space, defined by questions of equity in the provision of environmental/social goods. In this chapter, we propose the need to consider *quality* alongside a traditional concern with proximity, and the need for a more nuanced and dynamic understanding of green space use and perception.

Therefore, the focus is on how we can maximise what green space does for us in terms of health benefits and not simply on measuring their distribution. In this context, quality can be conceptualised in terms

of the range of positive affordances experienced by the greatest spectrum of green space users without unduly reducing the positive affordances experienced by another user. However, moving beyond analysis, the affordances star approach also provides a heuristic device for planners and designers working at a range of spatial scales to explore relationships and the influence of proposed design interventions. The research methodology for the Eco-Health project comprises four inter-related stages and approaches, summarised in Figure 4.2.

4.4.1 Documentary analysis

The first stage of the research involved a documentary analysis related to understanding the literature and evidence surrounding health and green space and also the policy context, internationally and nationally. Drawing on the affordances framework, the literature review (presented in Chapter 2) was organised as a life-course analysis to understand how different groups may experience green space differently, may have contrasting needs (in terms of types of green space and green space design) and may benefit from green space in different ways. The analysis of key policy documents revealed that, although policy is increasingly recognising the health benefits of green space and green infrastructure, actual guidance on green space design is more limited, often resulting in a focus on green space provision rather than green space attributes and design.

4.4.2 Qualitative interviews

These themes were further explored in the second stage of the research through qualitative, in-depth

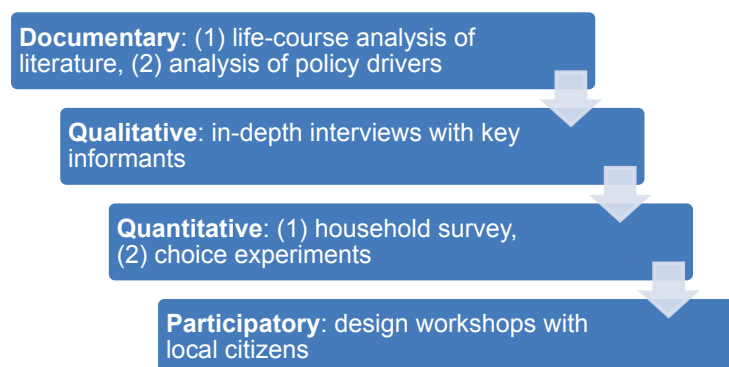


Figure 4.2. Summary of research methodologies.

interviews with key informants. Interviewees were selected from relevant professional groups, including Healthy Cities and Counties co-ordinators, health promotion officers, NGOs, key local authority officers, such as local authority planners, park department representatives and community development officials, and representatives from public bodies involved in green space provision. These interviews probed issues around opportunities for and constraints on maximising green spaces as health-promoting environments and also informed the design of the household survey instrument.

4.4.3 Quantitative surveys and analysis

The third stage of the research methodology entailed the design of a household survey instrument and its implementation in five locations across three case study local authorities: one large urban centre, two suburbs and two rural areas (outlined below). The household survey results were further validated and tested through the implementation of choice experiments in two case study areas, further exploring green space attributes.

4.4.3.1 Case study areas

Tallaght town centre is located to the south-west of Dublin city centre and is characterised by a dense residential environment of apartment blocks, offices buildings, a hospital, one of Ireland's largest shopping malls, a theatre and a number of hotels (Figure 4.3). A significant volume of space in the area is allocated to multi-storey and surface car parking. The area is also well serviced by bus routes and a light rail transit system. Approximately 5700 people live in Tallaght town centre, with a diversity of socio-demographic characteristics (age, ethnicity, social class) evident (CSO, 2016). There are a number of well-maintained parks located in proximity to the area (Figure 4.4).

The suburban developments of Viewmount and Powerscourt are located on the Dunmore Road, south-east of Waterford city. Adjacent to the River Suir, University College Waterford and a shopping district and on a direct bus route to the city centre, these residential areas are closely associated in terms of land use, history, social ties, demographics (age and ethnicity) and socio-economic characteristics. Referred to collectively as the Dunmore Road area, approximately 2000 people live in this case study



Figure 4.3. Tallaght town centre.



Figure 4.4. Sean Walsh Park, Tallaght.

area (CSO, 2016). The residents of the area have a relatively high level of educational attainment and a high proportion of the local population are retired or are employed within occupations classed within the higher socio-economic categories used by the Irish Central Statistics Office (CSO). This area is characterised by a number of green spaces, including Viewmount Green and a discontinuous pedestrian path along the River Suir. The Dunmore Road area is an established settled area that lacks a distinct “activity hub” for the community.

The contiguous suburban areas of Ballybeg and Kilbarry are situated south-west of the centre of Waterford city and are closely associated in terms of land use, history, social ties, demographics (age and ethnicity) and socio-economic characteristics. Approximately 4000 people live in this suburban area (CSO, 2016). The residents of the area have a relatively low level of educational achievement compared with other suburban areas in the city, and a high proportion of the local population are employed in occupations classed within the lower socio-economic categories used by the Irish CSO. Ballybeg–Kilbarry is characterised by extensive areas of accessible green

space provision (Figure 4.5), although the quality of such space is poor, with vandalism a recurrent problem in the area. Vehicular movement in the area is facilitated by a number of wide roads, almost all of which include a generously proportioned footpath (Figure 4.6). A small convenience store services the area. Adjacent to this is the façade of a pub that was destroyed in a fire in April 2011. A community centre café and fenced community garden located nearby currently serve as the “activity hub” for the community.

Banagher is rural town of approximately 1760 people located in County Offaly in Ireland’s midlands (CSO, 2016). The area surrounding the town is characterised by fertile agricultural lands and family farmsteads of cereals and dairy. The economy of the town is closely linked to its agricultural hinterland and a sizable cement factory located immediately west of the town centre. Located at the northern extent of the town is the expansive River Shannon (Figure 4.7), an associated harbour area and a series of large seasonal wetlands. The town effectively comprises two main streets on which are situated a number of shops and a pub (Figure 4.8). These streets converge at a central square, which is largely occupied by car



Figure 4.5. Green space in Ballybeg.



Figure 4.6. Road network in Ballybeg, Waterford.



Figure 4.7. Green space located on Shannon River, Banagher.



Figure 4.8. Main Street in Banagher.

parking areas. The “activity hub” of the town is a small mall occupied by a supermarket, takeaway and three small shops.

Finally, Daingean is a rural village of approximately 1080 people, also located in County Offaly (CSO, 2016). The area surrounding the village is characterised by agricultural land and commercial peat production. The economy of the town has declined in line with the decline of the peat industry in the area. The village, which is bisected by the Grand Canal, comprises a single main street on which is situated a single shop, a pub, residential dwellings and vacant and derelict commercial premises. Small residential estates branch off from the main street, with a ribbon-type housing development to the north of the town. There is a children’s playground adjacent to the Grand Canal. Castle Barna Golf Club, which straddles the canal, is accessed from the village at the northern bridging point. The extensive Mount Lucas Wind Farm and recreational facility (walking and cycling) is located approximately 4 km south-east of the village (Figure 4.9).

4.4.3.2 Questionnaire survey

A standardised interviewer-administered household survey questionnaire was designed to capture

information relating to the use of the outdoor environment, with a particular focus on nearby green spaces. A range of questions were developed to investigate respondent perceptions of outdoor environments, both in general and in the local area. Further questions explored self-assessed outdoor behaviours and health and well-being, in addition to important socio-demographic and household information. Titled the Eco-Health Survey 2017, the survey was divided into six sections. These were (A) you and the outdoor environment; (B) your outdoor activity preferences; (C) your local area; (D) your health and well-being; (E) household information; and (F) general questions about you. The survey booklet itself extended to 20 A4 pages, comprising 217 unique variables.

In cross-sectional research, a sampling strategy that focuses on attaining small random samples with high response rates is considered more valuable than achieving large random samples with low response rates (see Evans, 1991). Thus, the former approach was utilised for this study. In each of the suburban case study locations (Ballybeg/Kilbarry and the Dunmore Road area), a random sample of 300 addresses was drawn from the address model of the An Post GeoDirectory, a complete database of every address in Ireland (Fahey and Finch, 2012). In



Figure 4.9. Mount Lucas Wind Farm and recreational facility, Daingean.

the rural locations (Banagher and Daingean), given the relatively low population size in each location, all addresses were included, that is, the sample was the total population of these locations. In Tallaght, the urban environment, an inflated random sample of 600 addresses was drawn on the basis that earlier research has recorded low response rates in urban environments, particularly in locations where secure apartment blocks predominate (Douglas *et al.*, 2018).

The survey questionnaire was subsequently administered by field administrators using a predefined procedure that required up to three call attempts at each address until 100 responses were obtained or surpassed in each location, with the data collection period not exceeding 10 days in each environment type. Between June and August 2017, this procedure resulted in 531 questionnaires being completed overall – 94 in the urban environment over 10 days, 204 in the suburban environment within 9 days and 233 in the rural environment within 9 days. Details were kept for each survey attempt, including date and time and reasons for non-response (e.g. suspected vacancy, inability to gain access) or ineligibility (e.g. ill health, lack of fluency in English, not a permanent residence).

Descriptive statistical analysis was employed to explore the perceptions of the outdoor environment and the use thereof by respondents across the five case study locations. In order to facilitate analysis, observations were grouped into three age ranges – 18–34 years, 35–54 years and 55+ years – and cross-tabulations were run with cleaned and recoded variables (where necessary). Furthermore, the two suburban case studies were merged to represent the broad “suburban” context and the two rural case studies were merged to represent the “rural” context. Pearson’s chi-square tests for independence were used to test for statistically significant relationships between the thematic variables and life-course stage. This element of the analysis was designed to identify potential differences in use and perceptions of the outdoor environment and green spaces according to life-course stage and in different residential settings (i.e. urban, suburban and rural). For all statistical analyses, the study considered relationships to be significant only at an alpha level of 0.05. These methods were supported by qualitative information provided in open-ended questions.

4.4.3.3 *Choice experiments*

The main survey was followed by a shorter companion survey that included a discrete choice experiment (DCE). A choice experiment is an environmental economic method that encourages people to choose between two alternative scenarios that consist of various levels of characteristics, or attributes. The aggregate choices of respondents reveal their probability of choice – or preference – for each alternative and its constituent attributes. In generic exercises the alternatives represent the same product, with the same attributes presented at different levels (e.g. seating, no seating). Instead, the exercise can be alternative specific by presenting the same class of product (e.g. parks) but in a different type (e.g. small parks, big parks). In some alternative specific exercises, a few attributes may also be different. In either case, the exercise forces people to choose between two alternatives. Economists believe that this process of choice conforms more closely to actual behaviour than the common method of eliciting of ranks or ratings. Therefore, the choice experiment survey enabled the research team to further probe and understand the green space attributes identified in the main survey. The choice experiment was undertaken in Waterford and Offaly only, as gaining access to apartment complexes in Tallaght (South Dublin) had proved challenging within the main survey, adding significant cost and time constraints. The full details of the choice experiment design are provided in Chapter 6.

4.4.4 *Participatory research: design workshops with local residents*

A community engagement tool was developed to elicit and study people’s perceptions of potential planning and design interventions seen as necessary to entice them to actively engage with their local environment more frequently. As such, the method seeks to connect people with places, and thereby furnish context sensitivity in the information garnered, and to further explore the design attributes identified in the previous research stage. In summary, the method was sequentially deployed in a two-step process, namely (1) “sorting” and (2) “spatialisation”, using map exercises and design preferences to explore green

space attributes and distribution. The methodology is fully elaborated in Chapter 6 and a complementary “How to Guide” and detailed guidance on how to

implement this method and the material necessary to do so are available at <http://www.ecohealth.ie> and www.epa.ie/researchandeducation/research/safer.

5 A Life-course Analysis of the Use and Perceptions of Outdoor Environments by Urban, Suburban and Rural Residents

5.1 Introduction

This chapter addresses these issues by outlining the results of a household survey which was specifically designed to undertake an empirical analysis of the use of outdoor environments by adults of all ages according to life-course stage in the urban, suburban and rural context. First, the methodology for this element of the research is outlined. Second, findings pertaining to the reported use of the outdoor environment are explored, including the identification of favourite outdoor environments. Finally, perceptions of and the use of local and nearby green spaces is investigated, with a particular focus on variation by life-course and by environment type (i.e. urban, suburban and rural). By collecting and prudently analysing this information using a “Where? What? When? How? Why?” formulation, it is possible to better understand how populations in different local contexts and at different stages in their adult life perceive and use the outdoor environment and the potential implications of such perceptions and behaviours for their health and wellbeing. Also, by better understanding the characteristics of favourite outdoor environments, the replication of such characteristics where possible could act to encourage more frequent and meaningful use of local green spaces and networks which are planned, designed and managed with such characteristics in mind.

5.2 Respondent Profile and Summary Descriptive Statistics

Table 5.1 shows sample statistics for each neighbourhood type (i.e. urban, suburban and rural), including a breakdown of respondents by gender, age, educational attainment, employment status, household type, origin, dwelling type, tenure type and period of time living in current residence.

As can be seen in Table 5.1, there was considerable variation across area types for these variables. Such variation is in line with official population statistics

for the locations. It is argued that such variation will have direct implications for green space provision and the design of the public realm, which responds to the characteristics of the population. Taking dwelling type, for example, in the urban environment, all respondents live in an apartment or flat, compared with none of the suburban respondents and 0.4% of the rural respondents. Such dwellings are generally characterised by a low quantum of private open space, that is, whereas suburban and rural respondents tend to have homes with front and/or back gardens, this is not the case in the urban environment, meaning that the provision of shared and public open spaces that meet people's requirements will be important for such populations. Such considerations are amplified when household type is considered. In the Irish context, apartment living is often, but incorrectly, associated with single occupants and childless couples. The results here show that a greater proportion of urban respondents than the average have children (50%), across all three environment types (42.6%).

It is also clear that the urban environment is a more transient environment, with the majority of respondents (75.5%) living in their residence for 5 years or less, having a non-Irish origin (73.4%), renting (84.1%), being well educated (56% with a primary degree or higher) and aged 34 years or less (53.2%), with only 9.6% aged 55 years or over. Cultural variation and a lower age profile would suggest that green space and public realm attributes desired and required in such a context might differ substantially from those located in the suburban or rural environment, which is characterised by a very different population profile. Indeed, the proportions of retired and older people in both the suburban and the rural environments would suggest the need for a different green space and public realm design response.

Notwithstanding these recorded variations, differences in health, well-being and individual preferences may influence the needs, desires and behaviours of residents of different ages in different environment

Table 5.1. Sample statistics for each neighbourhood type

Variable	Urban (n=94) (%)	Suburban (n=204) (%)	Rural (n=233) (%)	Total (n=531) (%)
Gender				
Female	42.6	54.4	58.4	54.0
Male	56.4	45.6	41.6	45.8
Not stated	1.1	0.0	0.0	0.2
Age (years)				
18–34	53.2	21.6	23.7	28.1
35–54	37.2	35.3	30.2	33.4
55+	9.6	43.1	46.1	38.5
Educational attainment				
No formal education	0.0	0.5	0.9	0.6
Primary	1.1	8.3	6.0	6.0
Lower secondary	2.2	19.6	14.2	14.2
Upper secondary	16.1	24.0	26.6	23.8
Technical or vocational	2.2	2.9	3.9	3.2
Upper secondary and technical or vocational	2.2	2.9	5.6	4.0
Non-degree qualification	20.4	10.3	15.5	14.3
Primary degree	31.2	24.0	21.5	24.2
Postgraduate certificate or diploma	2.2	1.5	2.1	1.9
Postgraduate degree	21.5	4.4	2.6	6.6
Doctorate	1.1	1.5	0.9	1.1
Not stated	0.0	0.0	0.4	0.2
Employment status				
Self-employed	2.1	5.4	5.2	4.7
Employed	67.0	46.1	40.8	47.5
Unemployed	12.8	2.5	8.6	7.0
Retired	4.3	33.3	30.0	26.7
Unable to work	6.4	2.9	4.3	4.1
Student	0.0	5.4	1.7	2.8
Home keeper	6.4	3.9	9.4	6.8
Other	1.1	0.5	0.0	0.4
Household type				
One person	9.6	15.7	17.2	15.3
Couple	21.3	30.9	34.1	30.5
Couple with children	39.4	28.4	33.6	32.6
One parent with children	10.6	12.7	7.3	10.0
Other configuration	19.1	12.3	7.8	11.6
Origin				
Ireland (incl. Northern Ireland)	25.5	91.2	94.8	81.2
Elsewhere	73.4	8.8	5.2	18.6
Not stated	1.1	0.0	0.0	0.2
Dwelling type				
Apartment or flat	100	0.0	0.4	17.8
Mid-terraced house	0.0	34.3	12.1	18.5

Table 5.1. Continued

Variable	Urban (n=94) (%)	Suburban (n=204) (%)	Rural (n=233) (%)	Total (n=531) (%)
Semi-detached/end of terrace	0.0	50.0	39.2	36.5
Detached house	0.0	15.7	48.3	27.2
Tenure type				
Owned outright	11.7	50	60.9	48.0
Owned with mortgage	4.3	13.7	16.3	13.2
Private rented	77.7	10.8	10.7	22.6
Public rented	6.4	25.5	11.2	15.8
Not stated	0.0	0.0	0.9	0.4
Time in current residence				
< 1 year	26.6	7.8	3.9	9.4
1–5 years	48.9	10.3	16.7	20.0
6–10 years	24.5	9.3	15.0	14.5
11–20 years	0.0	21.1	21.9	17.7
> 20 years or since childhood	0.0	51.0	42.5	38.2

Table 5.2. Self-rated life satisfaction and happiness

Variable	Urban (n=94)	Suburban (n=204)	Rural (n=233)	Total (n=531)
Life satisfaction, where 0 = very dissatisfied, 8 = very satisfied, 4 = midpoint				
Average life satisfaction	6.30	6.89	6.61	6.66 (SD 1.34)
Happiness, where 0 = very unhappy, 8 = very happy, 4 = midpoint				
Average happiness	6.44	6.98	6.84	6.82 (SD 1.25)

SD, standard deviation.

types. Indeed, the provision and configuration of existing green spaces and public realms are likely to influence how residents relate to them and ultimately use them. Table 5.2 sets out summary descriptive results for variables pertaining to life satisfaction and happiness.

On average, most respondents across all environment types reported that they were rather satisfied with their life as a whole. Although there was some variation, with suburban residents, on average, reporting the highest level of satisfaction and urban residents reporting the lowest level, such variation was minimal, with the standard deviation (SD) of responses cancelling out this effect. A slightly larger proportion of respondents reported a high level of happiness, with a similar trend emerging by environment type and a similar SD. This would suggest that, although the local environment potentially contributes to reported happiness and life satisfaction, there

is minimal variation by environmental context.

Table 5.3 summarises descriptive results pertaining to satisfaction with physical and mental health and well-being.

Reported satisfaction with physical health was similar across environment types, with approximately four out of five respondents reporting that they were satisfied or very satisfied with their physical health, ranging from 78.9% in the suburban environment to 80.6% in the rural environment. For mental health and well-being, the average level of satisfaction was even higher, with 94.2% of all respondents being satisfied or very satisfied with their mental health and well-being. This ranged from 90.5% in the urban environment to 96.1% in the suburban environment. These results suggest that residents of all environment types report similar levels of satisfaction with their physical and mental health and well-being.

Table 5.3. Satisfaction with physical and mental health and well-being

Variable	Urban (n=94)	Suburban (n=204)	Rural (n=233)	Total (n=531)
Satisfaction with physical health (%)				
Very dissatisfied	0.0	0.5	0.0	0.2
Dissatisfied	9.8	10.3	7.3	8.9
Neither satisfied nor dissatisfied	10.9	10.3	12.1	11.2
Satisfied	54.3	62.7	57.3	58.9
Very satisfied	25.0	16.2	23.3	20.8
Satisfaction with mental health and well-being (%)				
Very dissatisfied	1.1	0.5	0.0	0.4
Dissatisfied	5.3	0.5	2.1	2.1
Neither satisfied nor dissatisfied	2.1	2.9	3.9	3.2
Satisfied	62.8	59.3	56.2	58.6
Very satisfied	27.7	36.8	37.8	35.6
Non-response	1.1	0.0	0.0	0.2

Table 5.4 provides a breakdown of the reported frequency of strenuous, moderate and mild exercise over the course of a week. The National Guidelines on Physical Activity for Ireland (Government of Ireland, 2016) suggest that adults (aged 18+ years) should carry out at least 30 minutes a day of moderate intensity activity on 5 days a week (or 150 minutes a week). Considering moderate intensity exercise specifically, therefore, 18.9% of respondents reported undertaking moderate exercise practically every day, with a further 10.2% reporting that they undertake moderate exercise four to five times per week. Therefore, only 29.1% of respondents achieve the national target. This figure is broadly in line with the figure included in the National Guidelines on Physical Activity, which state that 31% of the adult population currently meet the exercise target. Indeed, when the results of the survey are broken down by area type, this figure is as low as 22.8% in the suburban environment, rising to 32.2% in the rural environment and 35.5% in the urban environment. The results therefore suggest that, although the target is not reached in any of the case study environments by a substantial margin, the urban environment is seen to perform best, with the rural environment and the suburban environment, in particular, performing worse. Although population age profiles might well be at play here, this target is for all adults not just youth. It therefore suggests that actions that make the local environment more appealing for moderate exercise

(such as fast walking and easy cycling) are required, not least in the rural and suburban environments. The next sections explore respondent use and perceptions of the outdoor environment.

5.3 Visits to Outdoor Environments

In order to elicit responses, before asking respondents what type of outdoor environments they use or visit regularly, the survey administrator defined an outdoor space as “any area outside of buildings”.¹¹

5.3.1 Where?

Respondents were first asked to identify the outdoor environment types where they undertake outdoor activity. Across the total sample, 811 outdoor spaces were identified; these were categorised into 17 different green space types (Table 5.5). Of these 17, “a public park or green space” emerged as the most commonly used or visited type of outdoor space, representing over a third of all responses (36.1%). Following this, a canal bank or riverbank emerged as the second most commonly visited outdoor space (20.1%). Respondents were also asked to indicate whether their most visited outdoor environment was in their local area, with 86.9% of respondents indicating that their most visited outdoor environment was in their local area. A Pearson’s chi-square test revealed that age was not significantly associated

¹¹ Respondents could identify up to four outdoor spaces that they use or visit regularly.

Table 5.4. Reported frequency of strenuous, moderate and mild exercise

Variable	Urban (n=94)	Suburban (n=204)	Rural (n=233)	Total (n=531)
Frequency of strenuous exercise (%)				
Never	39.4	51.5	61.8	53.9
Rarely	7.4	11.8	4.7	7.9
About once a week	9.6	4.9	4.7	5.6
Two to three times a week	26.6	16.2	13.3	16.8
Four to five times a week	12.8	10.8	11.2	11.3
Practically every day	4.3	4.9	4.3	4.5
Frequency of moderate exercise (%)				
Never	22.6	37.1	40.8	36.2
Rarely	7.5	12.4	3.9	7.8
About once a week	11.8	7.9	5.6	7.6
Two to three times a week	22.6	19.8	17.6	19.3
Four to five times a week	15.1	9.4	9.0	10.2
Practically every day	20.4	13.4	23.2	18.9
Frequency of mild exercise (%)				
Never	2.1	2.5	3.4	2.8
Rarely	3.2	4.9	2.1	3.4
About once a week	3.2	2.5	4.3	3.4
Two to three times a week	9.6	21.2	16.7	17.2
Four to five times a week	8.5	13.8	12.0	12.1
Practically every day	73.4	55.2	61.4	61.1

Table 5.5. Most visited environment type (%)

Environment type	Age (years)			Total
	18–34	35–54	55+	
Public park or green space	50.8	35.9	24.7	36.1
Canal or riverbank	20.8	13.5	25.9	20.1
Coastal area or beach	5.4	13.5	12.0	10.6
Greenway/green route/green cycleway	3.8	10.3	6.0	6.9
Own garden	0.8	3.2	10.8	5.3
Sports field	4.6	3.8	3.0	3.8
Children's playground	3.1	5.8	0.0	2.9
Hills/mountains	2.3	3.8	1.8	2.7
Forest or forest park	2.3	3.2	1.2	2.2
Peatland/bog	1.5	2.6	2.4	2.2
Local roads and streets	0.0	1.9	3.0	1.8
Wind farm	2.3	0.6	2.4	1.8
Lake	0.8	1.3	1.2	1.1
Local square or plaza	0.0	0.6	1.8	0.9
Golf course	0.0	0.0	1.2	0.4
Historic property/demesne	0.0	0.0	0.6	0.2
Other	1.5	0.0	1.8	1.1

with the most visited green space being in the local area or not [$\chi^2(2) \geq 2.481$, $p = 0.289$]. These results clearly suggest the potential importance of local green infrastructure elements (i.e. green space hubs and blue/green corridors) as locations for outdoor activity in all environment types.

Considering these responses across the life course, the most visited outdoor environment type by 18- to 34-year-olds across all environments was “a public park or green space”, with over half of respondents in this age cohort (50.8%) identifying this environment type. This suggests the potential importance of green space hubs, such as parks, for this age group. For the 35–54 years age group, “a public park or green space” was also the most visited environment, at 35.9%. However, the combined responses for a “canal or riverbank” (13.5%), “coastal area or beach” (13.5%) and “greenway/green route/green cycleway” (10.3%) exceeded the response for a “public park or green space” for the most visited environment types. This suggests that this middle-aged cohort (35–54 years) is more varied in the type of environment visited, with linear green/blue environments emerging as important. For those aged over 55 years, a “canal or riverbank” (25.9%) and a “public park or green space” (24.7%) were almost equally identified as the most visited outdoor environment, followed by a “coastal area or beach” (12.0%) and “own garden” (10.8%). The emergence of “own garden” reveals the potential importance of nearby spaces for those in the older age cohort, who may be less mobile, in addition to

environments that facilitate light or moderate levels of physical activity.

The type of environment where each cohort walked was found to vary by context (see Figure 5.1). In the urban context, 65.1% of those aged 18–34 years identified public parks as the outdoor environment where they walk, substantially higher than the 37.5% averaged across all respondents. This was followed by streets, roads and footpaths (27.9%), which was much more in line with the average response (28.1%). Similar proportions were identified for 35- to 54-year-olds in the urban environment, with 61.5% identifying parks and green spaces and 26.9% identifying streets, roads and footpaths as the outdoor environment where they walk. With these two age cohorts accounting for 89.7% of urban respondents who are active outdoors, this clearly highlights the particular importance of public parks and green spaces (in conjunction with streets, roads and footpaths) as locations for walking in the urban environment.

In the suburban context, different behaviours were recorded, with greenways and trails emerging as the preferred location for walking among 18- to 34-year-olds (35.1%). This was followed by streets, roads and footpaths (29.7%) and parks (21.6%). Given the local availability of parks in both suburban case study locations, this potentially demonstrates a preference among 18- to 34-year-olds for linear and looped walks integrated into the urban landscape as opposed to dedicated park provision (i.e. green space hubs). For 30.6% of suburban 35- to 54-year-olds, streets, roads and footpaths were the environment types where they walked, followed by parks (27.4%) and greenways/trails (17.7%). For the 55+ years age group in the suburban context, streets, roads and footpaths (38.6%) were the most common environment for walking, followed jointly by parks (20%) and greenways (20%). These results affirm the central importance of streets, roads and footpaths for activity across all age groups in the suburban environment. Furthermore, it highlights the potential importance of green networks as opposed to green space hubs for activity across all age cohorts.

In the rural environment, greenways and/or green routes/trails (including river and canal walks) were the types of environments where the highest proportion of respondents in all age cohorts walk. The highest proportion was for this type of environment was found

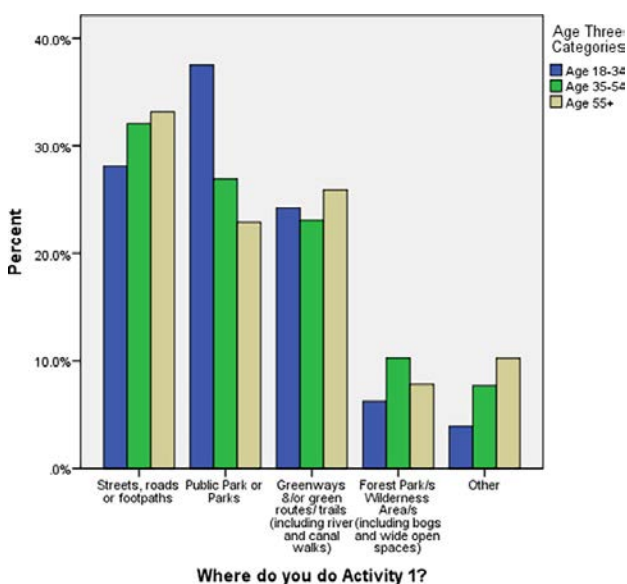


Figure 5.1. Most visited environment type by age cohort.

for 18- to 34-year-olds (37.5%). Although the highest proportion of 35- to 54-year-olds also identified this environment type as where they walk (36.8%), this was very closely followed by streets, roads and footpaths (35.3%). Only 13.2% of rural respondents aged 35–54 years identified a public park or green space as the location for this activity, with a similar proportion identifying forest parks or wilderness areas (11.8%). For those aged 55+ years, 31.8% walked on greenways and/or green routes/trails (including river and canal walks), followed by 29.5% on streets, roads and footpaths and 23.9% in public parks. Only a small proportion of each age group identified any other location as the outdoor environment where they walk: 2.1% for those aged 18–34 years, 2.9% for those aged 35–54 years and 4.5% for those aged 55+ years. In the rural context, it is therefore clear that green routes and trails are important for walking activity across all age cohorts. These, in addition to appropriate streets, roads and footpaths, are therefore central for the facilitation of walking in the rural environment.

5.3.2 What?

Across the entire sample, walking (including dog walking) was by far the most popular activity undertaken in the outdoor environment, with 73.4% of respondents who visit outdoor environments giving this response (Table 5.6). This was quite consistent across age cohorts, ranging from 70.5% of 18- to 34-year-olds to 77.5% of those aged 55 years and over.

In the urban environment, 66.2% of respondents identified walking as their primary outdoor activity. This was followed by visits to the playground with children, with 20.5% of respondents aged 18–34 years and 19.2% of 35- to 54-year-olds offering this response. This suggests the potential importance of destinations for children's play, in addition to adequate walking routes, for these cohorts in particular. In the urban environment, 24 respondents identified a secondary activity, with public parks identified by the majority in all age groups as the location where this activity takes place, followed by streets, roads and footpaths. Cycling (30.8%), running/jogging (23.1%) and socialising (23.1%) were identified as secondary activities for the 18–34 years age group. For the 35–54 years age group, cycling (33.3%) and running/jogging (22.2%) were the key secondary activities identified. Only two respondents aged 55 years or over in the urban environment identified a secondary activity, with both categorised as "other sports": boules and golf/pitch and putt.

In the suburban environment, walking was again the key recorded activity, with 81.7% of respondents identifying this as the primary activity that they undertake outdoors (see Figure 5.2). In total, 4.2% of 18- to 34-year-olds, 5.9% of 35- to 54-year-olds and 2.3% of those aged 55+ years identified visits to a playground with children as the activity that they undertake in the outdoor environment. In the suburban environment, 52 respondents identified a secondary activity. For 18- to 34-year-olds and 35- to

Table 5.6. Activity by age cohort (%)

Activity	Age (years)			Total
	18–34	35–54	55+	
Walking	64.3	64.5	72	67.2
Visiting the playground with children	10.9	7.1	2.4	6.5
Dog walking	6.2	7.1	5.5	6.2
Other or non-response	4.7	9.3	8.5	8.3
Field sports	3.9	1.9	1.2	2.2
Running or jogging	3.2	2.5	1.2	2.2
Cycling	2.3	2.6	2.4	2.5
Basketball	1.6	0.6	0	0.7
Socialising/meeting	0.8	3.2	3.7	2.7
Yoga/meditation	0.8	0	1.2	0.7
Eating/picnics	0.8	0.6	0.6	0.6
Skateboarding	0.8	0.6	0	0.4
Reading	0	0.6	1.2	0.7

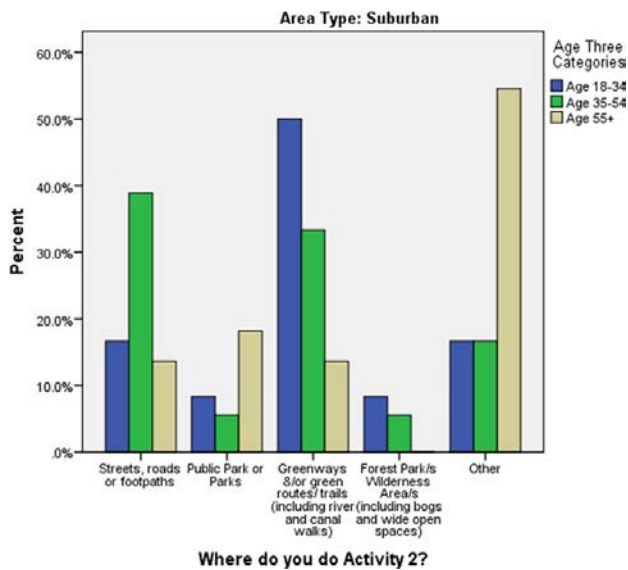


Figure 5.2. Location for secondary activity in the suburban environment.

54-year-olds, greenways and/or green routes/trails (including river and canal walks) were identified as the location where this activity takes place. Cycling was identified by 50% of 18- to 34-year-olds and 35- to 54-year-olds as the secondary activity that they undertake outdoors, which decreased to 13.6% for those aged 55 years or over. For the 55+ years group, socialising was an important secondary activity (27.3%), followed by “other sports” (22.7%). A high proportion of this group (54.5%) identified “other” locations, including golf courses and the coast, as the locations where this activity takes place.

In the rural area, 69.3% of respondents identified walking as the primary activity that they undertake (see Figure 5.3), 10.4% of whom specified dog walking. Indeed, 14.7% of 35- to 54-year-olds, 10.4% of 18- to 34-year-olds and 7% of those aged 55+ years specified dog walking as the (primary) activity that they undertake outdoors. In the rural environment, 80 respondents identified a secondary activity, with greenways and/or green routes/trails (including river and canal walks) being the most popular location to undertake this activity according to 18- to 34-year-olds (40%) and 35- to 54-year-olds (32.3%). Dog walking was identified by 27 (33.3%) respondents who responded that they undertook a second outdoor activity. This was the most popular secondary activity for those aged 18–34 years (42.9%) and 35–54 years (35.5%). For those aged 55+ years, the location for the secondary activity was split between streets,

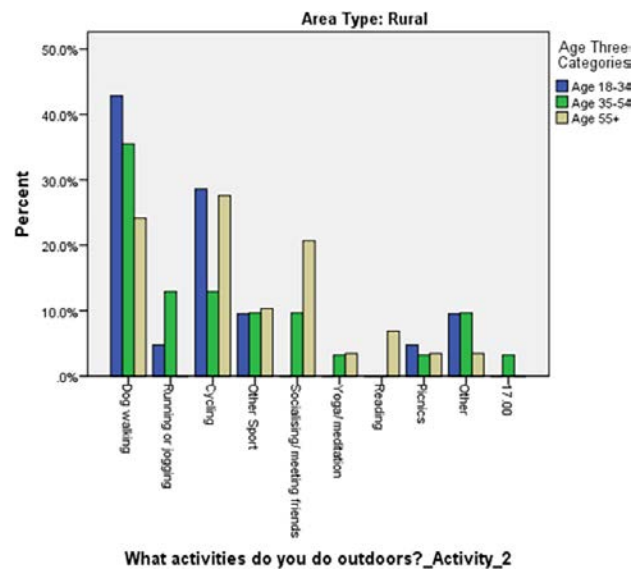


Figure 5.3. Secondary activity in the rural environment.

roads and footpaths (24.1%), public parks (27.6%), greenways and/or green routes/trails (including river and canal walks) (20%) and “other” locations, including sports facilities and their own garden (24.1%). For respondents aged 55+ years, cycling (27.6%), dog walking (24.1%) and socialising/meeting friends (20.7%) were identified as secondary activities.

5.3.3 How?

Across the sample, the most popular means of accessing the most visited outdoor environment was on foot (60.6%), followed by private car (33.2%) (Figure 5.4). The proportional split for those aged 35–54 years and those aged 55+ years was rather consistent (approximately 37% by private car and 58% by walking); however, a higher proportion of 18- to 34-year-olds tended to walk (66.2%) as opposed to travelling by private car (23.8%).

In the urban environment, the majority of residents walked to their most visited outdoor environment (76.9%), with 15.4% travelling by private car, 5.1% cycling and 2.6% taking the bus. Those aged 55+ years were most inclined to travel by car (28.6%), those in the middle cohort (35–54 years) were most inclined to walk (84.6%) and those aged 18–34 years were most inclined to cycle (6.7%). In the suburban environment, there was a clear tendency among those aged 35 years and over to travel to outdoor environments by private car, rather than on

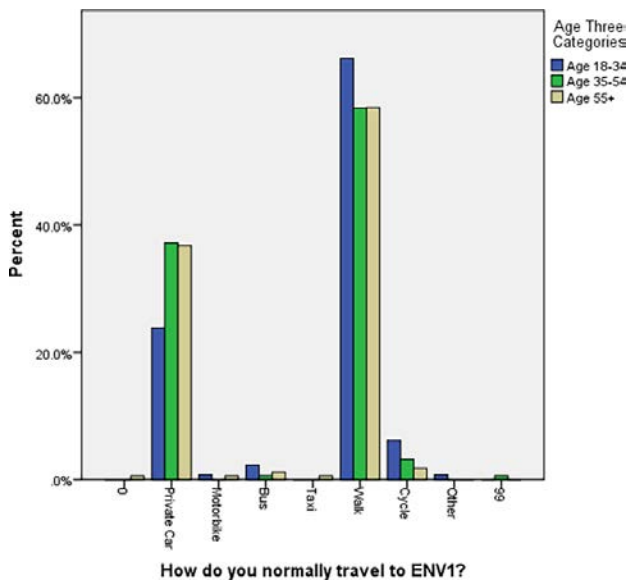


Figure 5.4. Accessing the most visited outdoor environment by age cohort.

foot. This may well be consequent on perceptions of low-quality local offerings and the presence of appealing coastal amenities within commuting distance, which were identified by a large proportion of the suburban residents as the outdoor environment types that they visit. On the other hand, the majority of 18- to 34-year-olds indicated that they travel on foot, in line with their tendency to visit local outdoor environments as opposed to those outside the local area. In the rural environment, 69.1% of respondents walk to the outdoor environment that they visit regularly whereas 26.5% travel by private vehicle. The over-55s are most inclined to walk (72.7%), whereas those in the 35–54 years age group are most inclined to travel by private car (32.4%), reflecting the aforementioned tendency of this age group to visit outdoor environments beyond the local area. Those aged 18–34 years were most inclined to cycle (6.2%), similar to their counterparts in the urban environment (6.7%) and more than those in the same cohort in the suburbs (5.4%).

5.3.4 When?

Across all age groups in the entire sample, 38.4% of respondents who reported spending time in the outdoors indicated that they visit their favourite outdoor location about two to three times per week (Figure 5.5); 27.8% indicated that they visit more often than this and 33.7% indicated that they visit less than this (once a week or rarely). A Pearson's chi-square

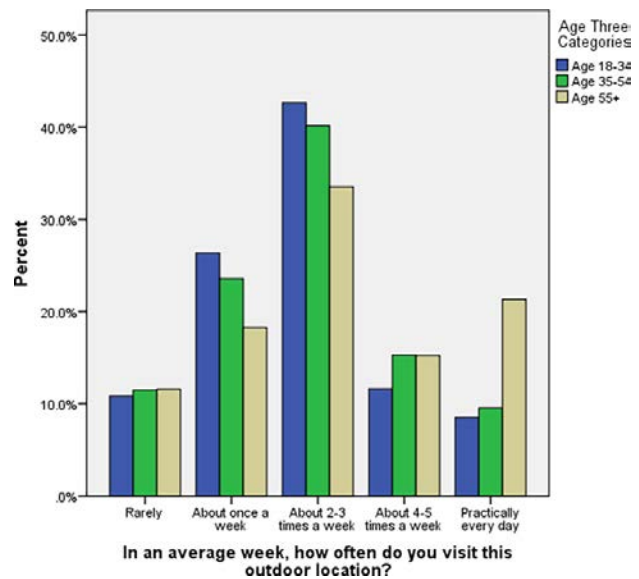


Figure 5.5. Frequency of visits to the most visited outdoor environments.

test revealed that the frequency of visit differs significantly by age cohort [$\chi^2(8) \geq 16.45$, $p = 0.036$].

A visual inspection of the proportional differences (see Figure 5.5) reveals that those aged 55+ years are more inclined to visit their favourite outdoor environment “practically every day” (23.1%) than those aged 18–34 years (8.5%) and those aged 35–54 years (9.6%). Those aged 18–34 years were least inclined to visit their favourite outdoor location over three times per week.

When considered across area types, some interesting trends emerge. The low number of responses from those aged 55+ years in the urban location ($n=7$) clearly influences the proportional distribution of responses by age group. The highest proportions of the other two age groups visit their favourite outdoor environment two to three times per week or less. In the suburban environment, the reported number of visits per week was proportionally similar across age groups (Figure 5.6a). Interestingly, those aged 55+ years were more inclined to visit “rarely” than those aged less than 55 years, the inverse of the situation for urban and rural environments, with an almost equal tendency of all age groups to visit practically every day. In the rural environment, higher proportions of all age groups were inclined to visit their favourite outdoor environment more regularly, resulting in a trend closely approximating a normal distribution around the middle option (about two to three times a week), except for those in the 55+ years age group, who were less

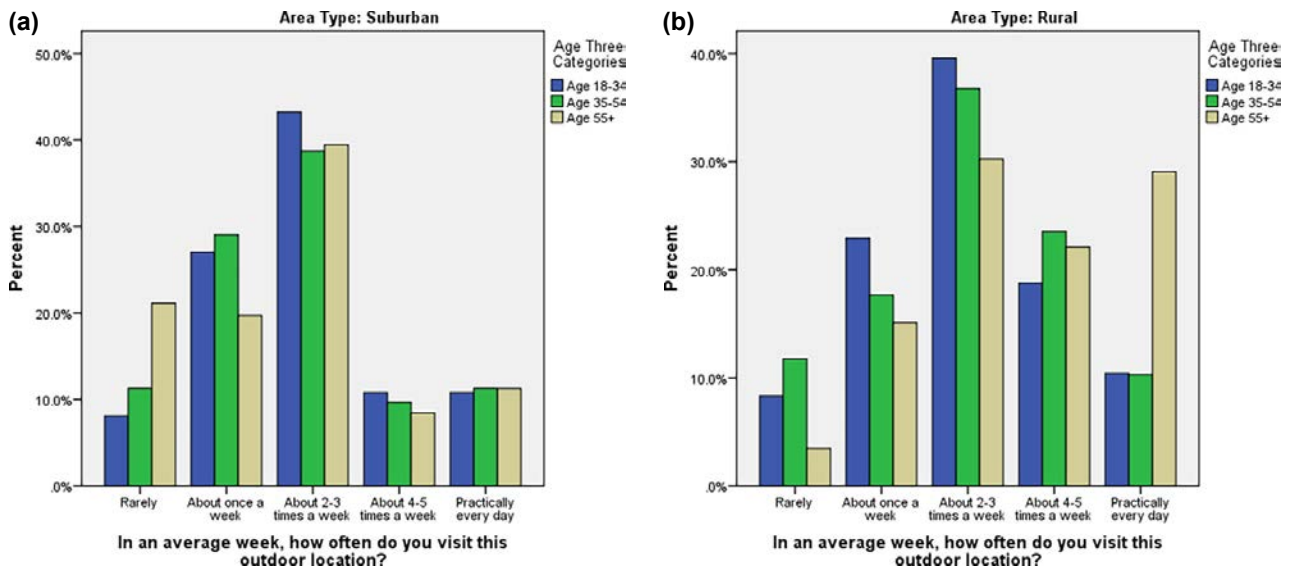


Figure 5.6. Frequency of visits to the most visited outdoor environments: (a) suburban respondents; (b) rural respondents.

inclined to visit “rarely” and much more inclined to visit “practically every day” (Figure 5.6b).

5.3.5 Why?

Across the entire response sample ($n=447$), “quietness”, followed by “green landscape character”, were identified as the key characteristics that attract respondents to their favourite outdoor environment (Figure 5.7). “Quietness” was identified by 36.2% of 18- to 34-year-olds, with 29.1% of this cohort identifying “green landscape character” as a key attribute. The third most popular primary characteristic for this group was the presence of “children’s play facilities”. For the 35–54 years age cohort, 46.5% identified “quietness” and 25.2% identified “green landscape character” as key characteristics. The third primary characteristic for this group was “sports facilities” (6.5%), closely followed by “children’s play facilities” (5.2%). Over half of the over 55s (51.5%) identified “quietness” as the most attractive characteristic, followed by “green landscape character” (24.2%) and presence of “plants and animals” (6.7%).

When considered across different area types, key differences could be identified according to age cohort. In the urban environment, “green landscape character” (45.5%) was the most attractive characteristic for 18- to 34-year-olds, followed by “quietness” (22.7%). For 35- to 54-year-olds, green landscape character was also highly valued (33.3%), followed by quietness (29.6%). For the 55+ years age group (small in this

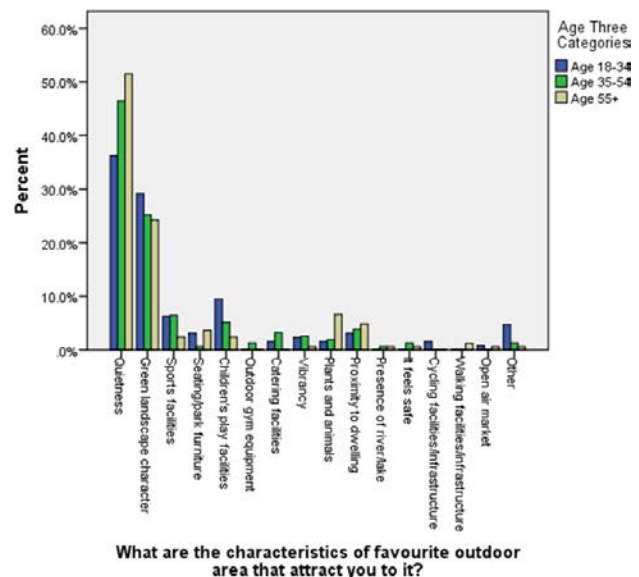


Figure 5.7. Key characteristic of the favourite outdoor environments.

area), quietness was the most valued characteristic in the urban environment (42.9%). This suggests that, within the urban environment, significant value is placed on “green character” by respondents, which may well be perceived as lacking in their immediate residential environment, with “quietness” also being important, particularly in the 55+ years age cohort. In the suburban environment, quietness was highly valued by all cohorts as a primary characteristic of their favourite outdoor environment (18–34 years: 47.2%; 35–54 years: 51.7%; 55+ years: 48.6%), substantially more than green landscape character,

which was the second most highly ranked primary characteristic (18–34 years: 13.9%; 35–54 years: 25%; 55+ years: 31.4%). In the rural environment, “quietness” was once again a primary characteristic of favourite outdoor environments, particularly for those aged 55+ years (54.5%) and 35–54 years (48.5%). Although also an important characteristic for 40.4% of 18- to 35-year-olds, “green landscape character” (25.5%) and “sports facilities” (17%) were also identified as important characteristics.

Respondents were also asked to identify specific attributes, defined as “additions and improvements”, that would encourage them to use the outdoor environment, ranging from streets, roads and footpaths, to parks, greenways and wilderness areas. Predefined response options were not provided. Instead, respondents were free to propose their own attributes, which were subsequently grouped into 15 common themes. Table 5.7 categorises these responses and identifies the proportion of respondents in each environment type who suggested each attribute.

Across all three environment types, the enhancement of pedestrian infrastructure emerged as the most sought after attribute that would encourage increased use of outdoor environments. This includes the addition and enhancement of footpaths, pedestrian/pedestrianised areas and pedestrian crossings, in addition to improved pedestrian signage and pedestrian safety measures, such as safety

railings and traffic calming measures, for example speed ramps. Other attributes identified in all three environments included the enhancement of existing parks and green infrastructure, including the extension thereof and improved surfacing. The addition of bins, particularly for dog litter, improved street and path lighting and additional seating, including picnic benches, were also identified as attributes that would increase usage in all three environment types.

Other attributes, although identified as important for the increased usage of the outdoor environment in one or two environment types, were not identified by respondents in the remaining environment type(s). Improved play facilities for children, for instance, were identified by 21.6% of suburban residents, 9.6% of urban residents and no rural residents. Similarly, enhanced cycling infrastructure was mentioned by urban and suburban respondents, but not by rural respondents. These findings clearly suggest that some additions and improvements may work to better effect in specific environments and to various levels. Table 5.8 summarises these data to suggest common and specific interventions. These are divided into strong and weak interventions based on the proportion of respondents who identified them in each environment type. If over 20% of respondents in a location identified a given intervention, it is considered strong (red), with interventions identified by less than 20% considered weak (blue).

Table 5.7. Attributes for increased use of the outdoor environment (%)

Attribute	Urban	Suburban	Rural
Enhanced pedestrian infrastructure	28.7	43.6	34.8
Enhancement of existing parks and green infrastructure	12.8	19.1	25.8
Addition and enhancement of green routes	3.2		13.3
Addition of new parks, including dog parks/areas	6.4	2.9	
Improved street and path lighting	6.4	6.9	13.3
More bins, particularly for dog litter	10.6	20.1	11.6
Additional seating, including picnic benches	4.3	3.4	5.2
Enhanced cycling infrastructure	4.3	9.8	
Improved sports facilities		2.9	
Improved play facilities for children	9.6	21.6	
Adult gym equipment	2.1	2.9	
Teen facilities			0.86
Toilet facilities	2.1	2.5	
Catering facilities, including coffee stands	2.1		
Improved security	7.4	2.5	

Table 5.8. Attributes for increased usage of outdoor environments

Common	Urban	Suburban	Rural
- Enhanced pedestrian infrastructure - Enhancement of existing parks and green infrastructure - Improved street and path lighting - More bins, particularly for dog litter - Additional seating, including picnic benches	- Enhanced pedestrian infrastructure - Enhancement of existing parks and green infrastructure - Addition and enhancement of green routes - Addition of new parks, including dog parks/areas - Improved street and path lighting - More bins, particularly for dog litter - Additional seating, including picnic benches - Enhanced cycling infrastructure - Improved play facilities for children - Adult gym equipment - Toilet facilities - Catering facilities, including coffee stands - Improved security	- Enhanced pedestrian infrastructure - Enhancement of existing parks and green infrastructure - Addition of new parks, including dog parks/areas - Improved street and path lighting - More bins, particularly for dog litter - Additional seating, including picnic benches - Enhanced cycling infrastructure - Improved sports facilities - Improved play facilities for children - Adult gym equipment - Toilet facilities - Improved security	- Enhanced pedestrian infrastructure - Enhancement of existing parks and green infrastructure - Addition and enhancement of green routes - Improved street and path lighting - More bins, particularly for dog litter - Additional seating, including picnic benches - Teen facilities

Red: strong (over 20% of respondents identified a given intervention); **blue:** weak (less than 20% of respondents identified a given intervention).

A notable finding across all age cohorts was the relative failure of “sports fields” or dedicated “sporting” infrastructure to emerge as the most visited environment type for a substantial proportion of respondents. Indeed, although 18- to 35-year-olds recorded the greatest proportion of primary visits to sports fields, this represented less than 5% of primary visits to outdoor environments for this cohort. This is despite the tendency of open space policy and funding streams to focus on the provision of sports fields and other dedicated sporting infrastructure for health and well-being, particularly for youth. Instead, for all age cohorts, key green infrastructure assets such as public green spaces (including city and town parks) and linking green and blue corridors (i.e. canals, riverbanks, coastal walks, greenways, etc.) emerge as the most visited outdoor environments. Wilderness environments, such as hills, mountains, forests, peatlands and lakes, that exist beyond the study areas emerged as the most visited outdoor environments for a much smaller proportion of respondents across all age cohorts compared with parks, public green spaces or linear routeways.

When considered by area type, in line with the aggregate results, the majority of respondents in the urban case study location identified a public park or green space as the outdoor environment that they visit most often. Although public parks remained the most visited outdoor environment, the suburban respondents recorded more varied outdoor preferences, with a coastal area or beach, a canal or riverbank and their own garden also emerging as places that they like to visit. Although the greater propensity of suburban respondents to visit non-park environments might well reflect the presence of such environments within commuting distance, this propensity was not recorded in the urban environment, despite the case study being located in close proximity to the Dodder River and the foothills of the Dublin mountains. In the rural environment, the outdoor environment visited by most respondents was a canal bank or riverbank, followed by a public park or green space. These findings, in combination with the high proportion of respondents indicating that their most visited outdoor environment is in what they perceive as their local area, suggest the importance of the provision of suitable outdoor environments within

the local environment, particularly for walking. It also demonstrates the appeal of linear greenways and blueways in the rural environment, key elements of a green infrastructure network.

5.4 Local Outdoor Environment

Before considering the “Where? Who? What? Why? When?” questions, in the context of their nearest outdoor environment, respondents were first asked to assess a range of statements to ascertain their general views on local mobility, that is, “getting about” the local area by various means. They were then asked to express the extent to which they agree with a range of general statements pertaining to green space in their local area. This exercise was designed to determine the perceived permeability and walkability of the various environment types by residents, in addition to their general perceptions of local green spaces.

5.4.1 General mobility statements

As reported in Table 5.9, across all age cohorts there was a high level of agreement with all five general mobility statements. Pearson’s chi-square tests revealed that, for the most part, responses did not vary significantly by age cohort. Only for the statement “This is a nice area in which to walk/move about” was a significant difference recorded, with significantly fewer respondents in the 18–34 years age group than in the older age cohorts agreeing with this statement. This suggests that the attributes of existing local environments are potentially less appealing for this age cohort than for the older groups in terms of walking/moving about.

The vast majority of respondents (96.9%) agreed with the statement, “It is easy to get around this area on foot”. However, although perceived ease of movement was recorded, a substantially lower proportion (79.9%)

were in agreement with the statement, “There is an adequate supply of walking routes in this area”. This implies that, across all age cohorts, respondents are less satisfied with the provision of walking routes. It is important to note that the statement referred to “adequate” routes, not even “good” routes. This highlights a potential need to improve the provision of such routes generally.

Considering differences by environment type, some dissatisfaction among 18- to 35-year-olds regarding the appeal of the local area for moving about was particularly noticeable in the urban environment, where responses for this age group were most variable (“disagree”: 15.9%; “neither agree nor disagree”: 15.9%; “agree”: 61.4%; “strongly agree”: 6.8%; Figure 5.8).

Only a very small proportion of 18- to 35-year-olds in the urban environment strongly agreed that it is easy to get around the urban environment on foot and no

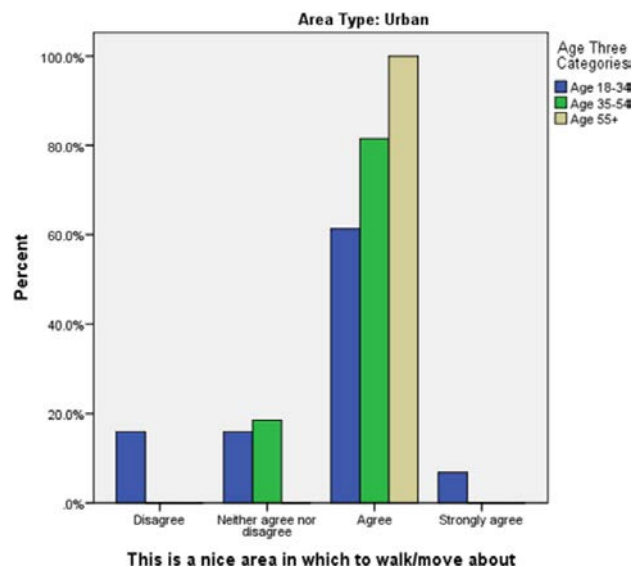


Figure 5.8. Urban environment: responses to the statement, “This is a nice area in which to walk/move about”.

Table 5.9. Agreement with general mobility statements (%)

Statement	Overall	18–34 years	35–54 years	55+ years	Pearson’s χ^2 test for independence
This is a nice area in which to walk/move about	89.4	80.6	92.3	93.4	$\chi^2(4) \geq 15.520$, $p = 0.004$
There is an adequate supply of walking routes in this area	79.9	78.3	79.0	82.0	$\chi^2(4) \geq 4.942$, $p = 0.293$
It is easy to get around this area on foot	96.9	96.1	98.1	96.4	$\chi^2(4) \geq 4.347$, $p = 0.361$
It is easy to get around this area by bicycle	85.2	89.9	85.4	81.4	$\chi^2(4) \geq 6.612$, $p = 0.158$
It is easy to get around this area without a car	82.7	86.8	84.0	78.4	$\chi^2(4) \geq 4.066$, $p = 0.397$

respondents across all cohorts strongly agreed that it is easy to get around the urban environment by bicycle. Indeed, although 87.3% of urban respondents agreed that it is easy to get around the area without a car, only 1.3% agreed that it is easy to get around by bicycle. Overall, these results suggest that perceived “adequate provision” of walking routes and cycling infrastructure in the urban environment does not necessarily indicate that provision is appropriate or appealing from a behaviour change perspective.

When asked to assess whether “this is a nice area in which to walk/move about”, “agree” was the most common response across all age cohorts in the suburban environment (18–34 years: 70.3%; 35–54 years: 66.1%; 55+ years: 73.2%; Figure 5.9). However, unlike the urban area, a greater proportion of all age cohorts selected the “strongly agree” response option (18–34 years: 13.5%; 35–54 years: 25.8%; 55+ years: 21.1%). This suggests that the existing suburban environment is more appealing as a place to walk than the urban environment.

In terms of there being an adequate supply of walking routes, unlike the urban environment, a proportion of suburban respondents in all cohorts strongly agreed (18–34 years: 5.4%; 35–54 years: 17.7%; 55+ years: 11.3%), with most simply agreeing (73.5%). Those aged 18–34 years were most inclined to disagree with this statement and least inclined to strongly agree. When asked about the ease with which they are able

to get around their local area on foot, the vast majority of respondents agreed or strongly agreed that it is easy (96.6%), with those aged 35–54 years most inclined to strongly agree (23%). Although 84.1% of all respondents agreed or strongly agreed that the suburban area is easy to get around by bicycle, 8.8% disagreed or strongly disagreed, in particular those aged 35–54 years (12.9%). Interestingly, suburban residents aged between 35 and 54 years were also the most inclined to “strongly agree” that it is easy to get around by bicycle (21%). This suggests that, within the prevailing suburban configuration, attitudes towards bicycle use range from positively skewed apathy to extremes of negative and positive attitudes, particularly in the 35–54 years age cohort. With regard to getting around the suburban environment without a car, 90% of respondents agreed or strongly agreed that it is easy to get around their area without a car. However, only 12.9% strongly agreed, mainly within the 35–54 years age cohort (19.4%), with 7% of the 55+ years age group disagreeing and only 8.5% strongly agreeing. Again, this suggests that there is a tendency to respond positively, but not very positively, and this is generally consistent across all ages.

The rural environment contained the largest proportion of all age cohorts who “strongly agreed” with the statement, “This a nice area in which to walk/move about” (18–34 years: 29.2%; 35–54 years: 29.9%; 55+ years: 26.1%; Figure 5.10), with the same positive skewness identified. Indeed, there was minimal

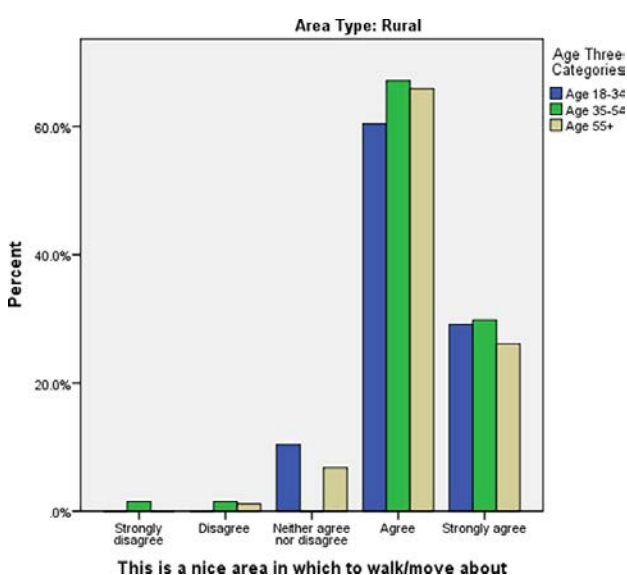


Figure 5.9. Suburban environment: responses to the statement, “This is a nice area in which to walk/move about”.

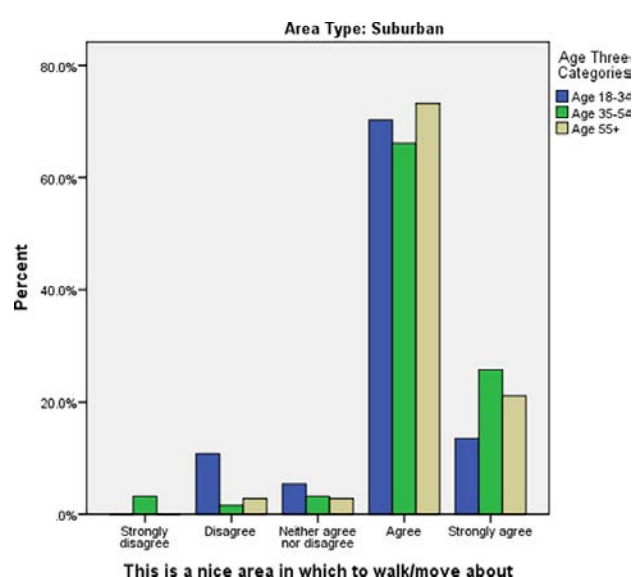


Figure 5.10. Rural environment: responses to the statement, “This is a nice area in which to walk/move about”.

disagreement with the statement across all cohorts. These results suggest that the rural environment is appealing for respondents as an environment in which to walk/move about. Delving deeper, only 21.1% strongly agreed that there is an adequate supply of walking routes in the rural environment, with 15.7% disagreeing or strongly disagreeing with this statement. This suggests that, although the rural environment is considered appealing as a place to walk/move about, it may lack suitable walking routes/infrastructure.

When asked whether they consider it easy to get around on foot, the vast majority of rural respondents agreed (98.1%), but less than a third strongly agreed (31.9%) (this was broadly consistent across age cohorts). With regard to cycling, the rural area recorded the highest proportion of respondents strongly agreeing that it is easy to get around by bicycle, including a third of 18- to 35-year-olds (33.3%) and approximately a quarter of 35- to 54-year-olds (27.9%) and those aged 55+ years (25%). In total, 7.4% of respondents disagreed that it is easy to get around by bicycle, with most offering the “agree” response (58.8%). Perhaps out of necessity (because of non-car ownership) 18- to 35-year-olds were most strongly of the view that it is easy to get around the rural environment without a car, with a third selecting the “strongly agree” response. Those aged 55+ years were more inclined to give a negative response to this statement, with 27.3% either disagreeing or strongly disagreeing with the statement. Overall, although 73.5% of respondents agreed or strongly agreed with the statement, there was a considerable spread in responses across all age groups, implying that, although the rural settlement might offer opportunities for walking and cycling, it may not be endowed with the appropriate infrastructures that make it suitable.

5.4.2 Green space statements

The statements in Table 5.10 related to respondents’ perceptions of the quantity of green spaces in their area, the influence of green spaces on the quality of life of local residents and the perceived role of local green spaces in promoting physical activity, recreation and social interaction among local residents, in addition to the perceived influence of green spaces on local property values.

As outlined in Table 5.10, the majority of respondents agreed or strongly agreed with each of the green space statements. Furthermore, Pearson’s chi-square tests revealed that responses did not vary significantly by age cohort. Of these statements, the highest level of agreement was with the statement pertaining to the value of green space in improving quality of life (87.4%), whereas the lowest level of agreement was with the statement regarding the influence of green spaces on local property values (57.4%). These findings suggest that, regardless of environment type, local green spaces are most valued for the “opportunities” that they provide to local residents in terms of the experiences they facilitate for the enhancement of local quality of life (i.e. physical activity, recreation and social interaction), rather than non-experiential “monetary” values such as enhanced property prices.

When considered according to environment type, some variation was identified. For the first statement, however, “There are plenty of green spaces in this area”, the level of agreement was remarkably similar across all age groups (Figure 5.11) and environment types. In all three environment types, very few respondents strongly agreed with this statement (urban: 5.1%; suburban: 5.9%; rural: 7.4%), with the majority in each case agreeing (urban:

Table 5.10. Agreement with green space statements (%)

Statement	Overall	18–34 years	35–54 years	55+ years	Pearson’s χ^2 test for independence
There are plenty of green spaces in this area	74.3	79.8	74.4	70.1	$\chi^2(4) \geq 4.27, p = 0.371$
Green spaces in this area improve the quality of life of local residents	87.4	87.5	91.0	83.8	$\chi^2(4) \geq 4.072, p = 0.396$
Green spaces in this area promote physical activity and recreation among local residents	73.5	72.9	76.3	71.3	$\chi^2(4) \geq 4.68, p = 0.322$
Green spaces in this area promote social interaction among local residents	70.4	74.4	67.9	69.5	$\chi^2(4) \geq 2.463, p = 0.651$
Green spaces enhance property values in this area	57.4	51.2	57.4	62.3	$\chi^2(4) \geq 4.231, p = 0.376$

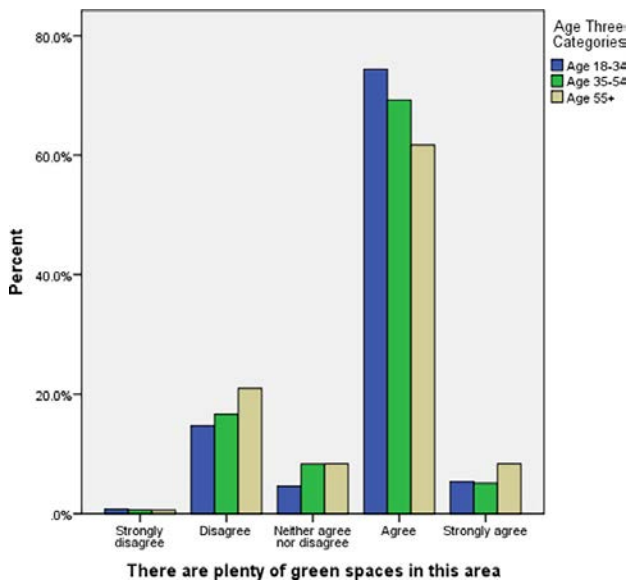


Figure 5.11. Responses to the statement, "There are plenty of green spaces in this area" by age cohort.

73.1%; suburban: 5.9%; rural: 62.3%). Perhaps most remarkable are the proportions of people who disagreed in each environment type (urban: 16.7%; suburban: 15.3%; rural: 21.6%). Despite being located in the countryside and surrounded by agricultural land, a (marginally) greater proportion of rural residents than urban and suburban residents disagreed that there are plenty of green spaces in this area. This disagreement was present across all age cohorts (18–34 years: 18.8%; 35–54 years: 16.2%; 55+ years: 27.2%). Rural respondents were also more inclined to provide a neutral response, particularly those in the older age cohorts. These results suggest that the assumed greenness of the rural environment and green space provision in urban and suburban environments by policymakers may be at odds with public perceptions.

For the statement, "Green spaces in this area improve the quality of life of local residents", rural respondents were most inclined to strongly agree (24.0%); the equivalent figures for suburban and urban residents were 14.2% and 6.4% (Figure 5.12). These findings suggest that rural respondents place significant emphasis on the potential contribution of green spaces to their quality of life. This may be part of the narrative of the "rural idyll", with urban residents placing greater emphasis on other aspects of their residential environment for improving quality of life. In saying this, across all locations, the vast majority of respondents agreed or strongly agreed that green spaces improve the quality of life of local residents (urban: 92.3%;

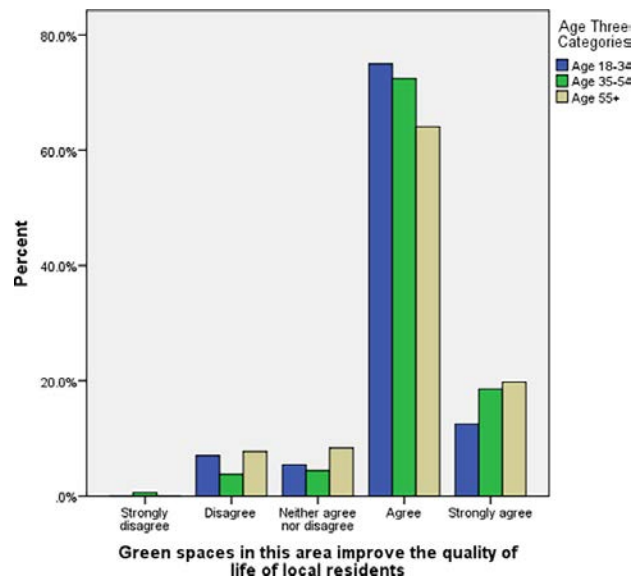


Figure 5.12. Responses to the statement, "Green spaces in this area improve the quality of life of local residents" by age cohort.

suburban: 86.4%; rural: 86.3%). Indeed, the propensity of urban residents to agree to any extent (92.3%) rather than disagree (6.4%) or offer a neutral response (1.3%) may well indicate an inherent appreciation of the potential quality of life benefits of urban green spaces. These findings are broadly consistent across all age cohorts.

Overall, most respondents agreed to some/any extent with the statement, "Green spaces in this area promote physical activity and recreation among local residents" (urban: 71.8%; suburban: 67.7%; rural: 78.9%). Rural residents were most inclined to strongly agree with this statement (19.6%), followed by suburban (7.1%) and urban (6.4%) residents. In terms of differences between age cohorts (Figure 5.13), 18- to 35-year-olds were most inclined to disagree with this statement in the urban environment (urban: 25.0%; suburban: 13.5%; rural: 18.8%). Higher levels of disagreement in the urban environment, followed by the rural environment, suggests a potential deficiency in supporting infrastructure for physical activity and recreation for 18- to 35-year-olds in these environments. However, 18- to 35-year-olds in the rural environment had a greater propensity than 18- to 35-year-olds in the other locations to strongly agree with this statement. This may relate to the strong Gaelic Athletic Association (GAA) culture, which is present in most rural towns and villages. Those who disagree may not be involved in the GAA culture and may perceive no real alternative for physical activity

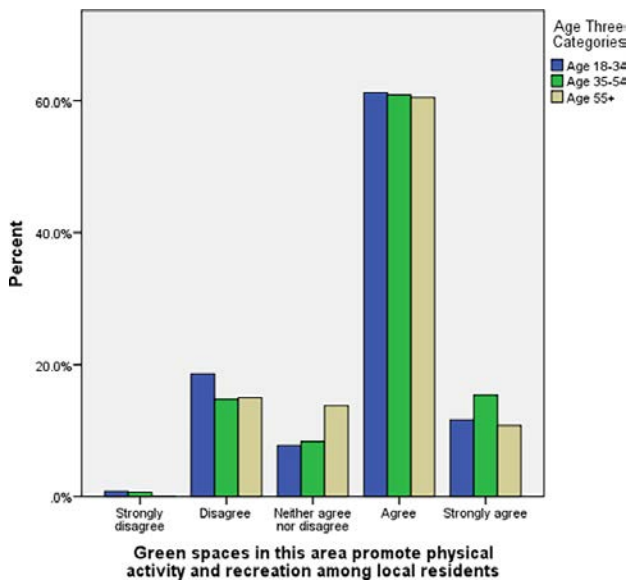


Figure 5.13. Responses to the statement, “Green spaces in this area promote physical activity and recreation among local residents” by age cohort.

and recreation. In the rural environment, 35- to 54-year-olds were most likely to be very satisfied, with very few disagreeing. This differed in the suburban environment, with the greatest proportion of those disagreeing being from this age cohort. Interestingly, although there was a positive response skewness overall, the suburban environment performed worst for the 55+ years age cohort, with the smallest proportion strongly agreeing and the highest proportion disagreeing compared with the other environments.

Next, respondents were asked to indicate the extent to which they agreed or disagreed with the statement, “Green spaces in this area promote social interaction among local residents” (Figure 5.14). Overall, most respondents agreed to some/any extent with this statement (urban: 65.4%; suburban: 67.1%; rural: 75%). Rural residents were also most inclined to strongly agree with this statement (19.1%), followed by suburban (5.9%) and urban (2.6%) residents. These findings highlight the potential importance of green spaces for promoting social interaction. In terms of differences between age cohorts, 18- to 35-year-olds were most inclined to disagree with this statement in the suburban environment (urban: 15.9%; suburban: 21.6%; rural: 10.4%). Given modern trends towards reduced social ties and the propensity for suburban residents to have a private vehicle and substantial private gardens, this suggests that shared local green spaces may not play as important a function for social interaction as in the rural environment for this age

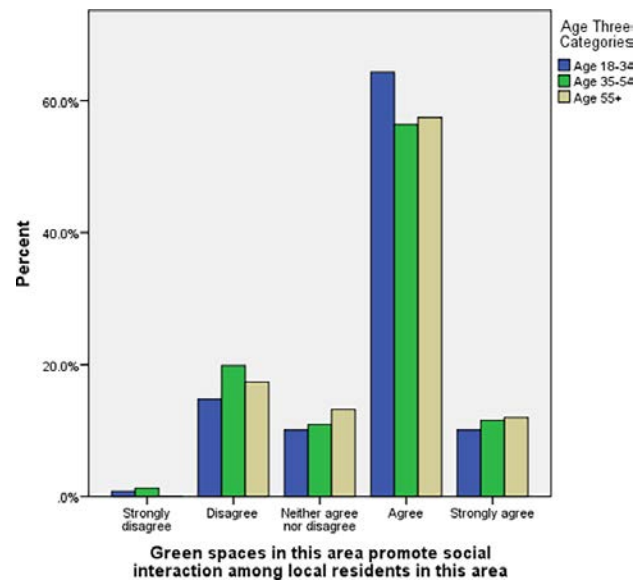


Figure 5.14. Responses to the statement, “Green spaces in this area promote social interaction” by age cohort.

group. Indeed, 20.8% of 18- to 35-year-olds in the rural environment strongly agreed that green spaces in the area promote social interaction, compared with just 4.5% of urban residents and 2.7% of suburban residents in this age cohort. For 35- to 54-year-olds, the highest level of agreement and the lowest level of disagreement were also seen in the rural environment. These findings suggest the importance of green spaces for social interaction in the rural environment and highlight potential shortcomings of such spaces in the urban and suburban environment for social interaction. Very similar trends were recorded for the 55+ years age cohort across environment types. Also of note was the consistency in responses across age groups in the rural environment, with greater variation evident in the urban and suburban cases.

Finally, respondents were asked to indicate the extent to which they agreed or disagreed with the statement, “Green spaces enhance property values in this area” (Figure 5.15). The proportion of respondents agreeing or strongly agreeing differed substantially by environment type. Indeed, a Pearson’s chi-square test revealed that this difference is statistically significant ($\chi^2(8) \geq 15.943$, $p=0.043$), with only 39.7% of urban respondents agreeing with this statement compared with 58.8% of suburban respondents and 63.1% of rural respondents. This suggests that the perceived “rural” character, with connotations of “greenness”, may well contribute to the emphasis placed on this by rural dwellers. To a slightly lesser extent, suburban

residents may well be referring to the idea of the “leafy suburb” and its potential enhancement of property values. In the urban environment, respondents may well consider other local features, such as proximity to services, as more important factors than green spaces in enhancing local property values.

5.5 Nearest Green Space

5.5.1 Where?

Although a general understanding of the perceptions of respondents’ local green spaces is useful, an understanding of what respondents consider to be their *nearest* green space and their views on this space can provide an enhanced understanding of the relationship that respondents have with nearby green spaces. In this regard, respondents were first asked to state the time in minutes that it takes them to walk from their home to what they perceive to be their nearest green space. Across the entire sample, the average time taken to walk to the nearest green space was just over 5 minutes, ranging from 30 seconds to 30 minutes (SD 5.5 minutes) (Table 5.11).

When analysed by area type, the longest average time taken to walk to the nearest green space was recorded in the urban environment (9.0 minutes, SD 6.7 minutes). Interestingly, the shortest average time (2.5 minutes) and also the smallest SD (3.2 minutes) was recorded in the suburban

environment. The average perceived time to walk to the nearest green space in the rural environment was 6.4 minutes, with a SD of 5.4 minutes, despite the study settlements being located within a green and countryside environment, suggesting a perceived or experienced distinction between usable green space and inaccessible green spaces or agricultural lands.

In the urban environment, the majority of respondents across all age groups identified their nearest green space as a large public park (67.6%), followed by a public park (20.8%). Only 11.7% of respondents identified their nearest green space as either a pocket park, a small green patch or area of grass, or a large green patch or area of grass. This was broadly consistent across age groups in the context of proportional responses (Figure 5.16).

Table 5.11. Time to walk to the nearest green space

Variable	Time (minutes)
<i>n</i>	
Valid	443
Missing	88
Mean	5.3352
SEM	0.26115
SD	5.49650
Variance	30.211
Range	29.50
Minimum	0.50
Maximum	30.00

SEM, standard error of the mean.

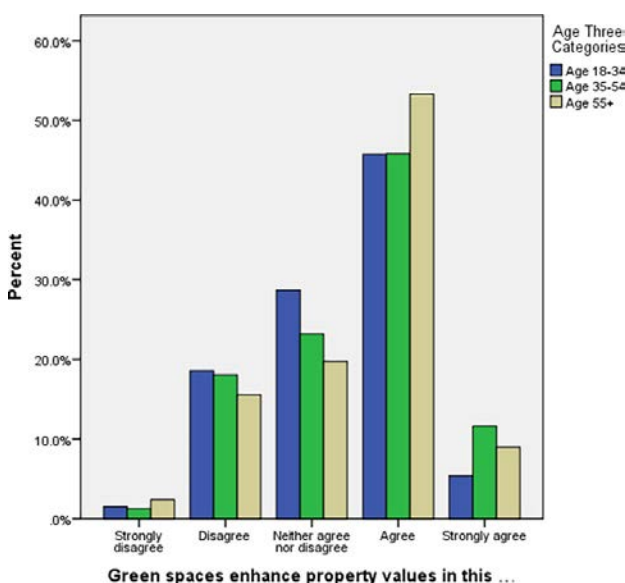


Figure 5.15. Responses to the statement, “Green spaces in this area enhance property values in this ...” by age cohort.

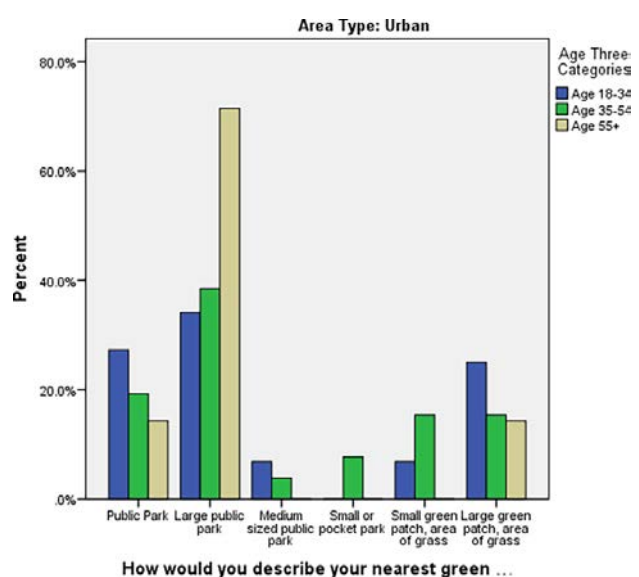


Figure 5.16. Urban environment: description of the nearest green space.

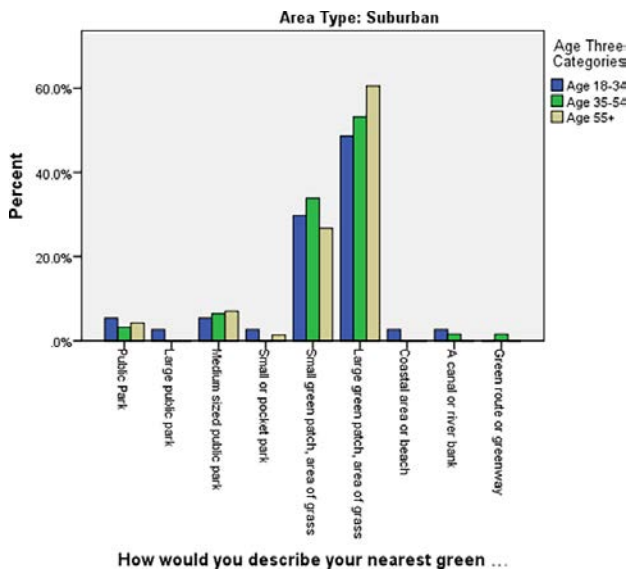


Figure 5.17. Suburban environment: description of the nearest green space.

In the suburban environment, the most common response was a large green patch or area of grass (55.3%), rather than a park of any kind (8.3%), as was the case in the urban environment. The second most common response was a small green patch or area of grass (31.2%). This trend was broadly consistent across age groups in terms of proportional response (Figure 5.17).

In the rural environment, the most common response was broadly divided between a large green patch and area of grass (28.4%) and a canal bank or riverbank (30.3%) (a green space type that did not feature strongly in either the urban environment or the suburban environment). This was followed by a small green patch or area of grass (17.9%). Public parks of any kind (including pocket parks) comprised only 9% of responses in the rural environment. These responses were proportionately similar across age groups (Figure 5.18).

5.5.2 What?

Reflecting the responses for outdoor activity preferences, the activity undertaken during the last visit to the nearest green space was dominated by walking (65.4%) and dog walking (9.6%; total 75%). The proportional split was similar across all

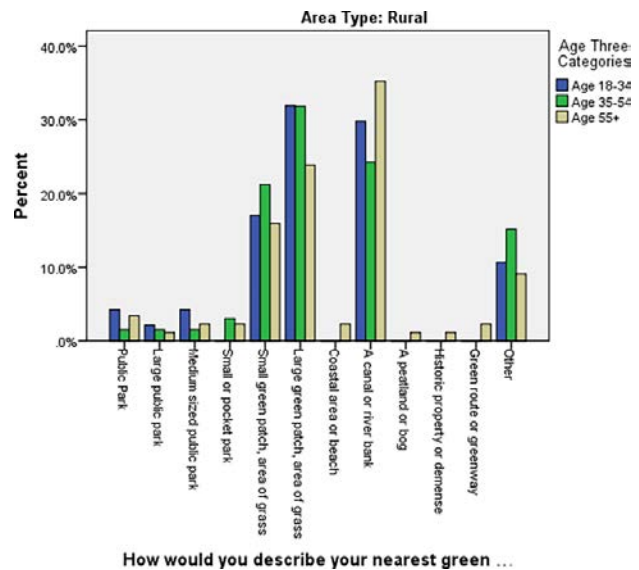


Figure 5.18. Rural environment: description of the nearest green space.

environment types, with dog walking mentioned marginally more by suburban and rural respondents. Interestingly, the next most cited activity was parkruns,¹² particularly in the rural environment (8.4%), followed by the suburban environment (5.4%) and the urban environment (1.7%). Field sports were mentioned by 2.9% of respondents, socialising by 1.6% and running and jogging and cycling by 0.8%. Activity preferences were proportionately similar in each age cohort, suggesting that activities other than walking (which are often age specific) are likely to take place outside of green spaces.

5.5.3 Who?

Respondents were subsequently asked to indicate the extent to which they agreed or disagreed that their nearest green space is accessible for people of all abilities. In the urban environment, 65.8% of respondents agreed (56.6%) or strongly agreed (9.2%) that their nearest green space is accessible to everyone, including people in wheelchairs and those with buggies; 21.0% of respondents either disagreed (18.4%) or strongly disagreed (2.6%). In the suburban environment, although the nearest green space was generally perceived to be closer than in the urban environment, it was considered less accessible for people of all abilities, with 50.6% agreeing (48.2%)

¹² Parkruns are free, weekly events comprising a timed 5-km run organised on a voluntary basis, usually taking place in parkland surroundings.

or strongly agreeing (2.4%), and a substantial 42.9% disagreeing (33.5%) or strongly disagreeing (9.4%) that their nearest green space is accessible. The rural environment had the highest proportion of respondents either agreeing (46.3%) or strongly agreeing (21.7%; 68.0% in total) that their nearest green space is accessible (predominantly canals and riverbanks or large patches of grass rather than parks). Responses were broadly similar across age groups, with 18- to 54-year-olds slightly more inclined to disagree that their nearest green space is accessible in the urban and rural environments, but with more similar response trends in the suburban environment.

Respondents were subsequently asked to indicate the extent to which they agreed or disagreed that their nearest green space is suitable for specific age cohorts: children, teenagers, adults and older people.

In the urban environment, 96.0% of respondents either agreed (93.3%) or strongly agreed (2.7%) that their nearest green space is suitable for children. In the suburban environment, this figure was 90.6%, with 88.2% agreeing and 2.4% strongly agreeing. In the rural environment, 90.2% either agreed (62.1%) or strongly agreed (28.1%) that their nearest green space is suitable for children. Although a high level of agreement was recorded across all environment types, it is notable that, despite having the greatest perceived distance to the nearest green space, urban residents almost unanimously agreed that this space is suitable for children. Also noteworthy is that such a high proportion of rural residents (almost 30%) strongly agreed with this statement. Responses were broadly similar across all age cohorts in each environment type.

A substantial majority of urban residents agreed that their nearest green space is suitable for teenagers (92.1%), with only 5.2% disagreeing to any extent, although none strongly agreed. The failure of any urban respondents to select "strongly agree" suggests that facilities deemed appropriate or necessary for teenagers in the nearest green space may be perceived to be lacking to some extent, but are broadly acceptable. In the suburban environment, 83.4% of respondents agreed, 1.2% strongly agreed and 12.4% disagreed with the statement to some extent. This higher level of disagreement most likely reflects the nature of the nearest green space – a patch of grass for the most part, as opposed to a

park with a wider range of facilities deemed broadly suitable for teenagers. In the rural environment, 85.2% of respondents either agreed (59.6%) or strongly agreed (25.6%) that their nearest green space is suitable for teenagers and 10.8% either disagreed (6.9%) or strongly disagreed (3.9%).

Although there was a higher level of disagreement compared with the urban environment, a key finding in the rural environment was the high proportion of respondents – over a quarter – strongly agreeing that their nearest green space is suitable for teenagers. The key feature differentiating the nearest green space in the rural environment from that in the urban or suburban environment was the prevalence of a canal or riverbank or "other" in this area, suggesting the potential contribution of such environments to the health and well-being of teenagers in the rural environment. As was the case for the perceived suitability of the nearest green spaces for children, the responses were proportionately similar across all age cohorts in each environment type for this variable.

In the urban environment, the vast majority of respondents (94.7%) agreed that their nearest green space (mostly reported as a public park or a large public park) is suitable for adults. Although suggesting high levels of perceived suitability, only 1.3% strongly agreed. This suggests that, although these green spaces are considered broadly suitable, respondents potentially have a "could do better" attitude. In the suburban environment, there was a much higher level of disagreement (20.6% compared with only 1.3% in the urban environment), particularly among those in the top two age cohorts (35–54 years and 55+ years). This may well be consequent on the majority of suburban residents identifying their nearest green space as a green patch or area of grass, rather than a park. Although some level of disagreement was expressed in the rural environment (9.9%), the vast majority of rural respondents across all age groups either agreed (62.9%) or strongly agreed (26.2%) that their nearest green space is suitable for adults. Again, what differentiates the nearest perceived green spaces in the rural settlement from those in suburban areas specifically is the presence of a canal and/or riverbank, potentially highlighting the perceived importance of such environments for rural residents in terms of their amenity value for adults.

The demographic profile of the urban environment was characterised by a very low proportion of older people.

In fact, there were only eight respondents aged 55+ years (less than 10% of the total) in the urban environment. This is in line with the demographic profile of the case study area. Despite this, 88.1% of urban respondents agreed and 2.6% strongly agreed that their nearest green space is suitable for older people, suggesting that urban residents consider urban parks to be suitable locations for older people to spend time in. Indeed, all respondents in the 55+ years age cohort either agreed or strongly agreed with this sentiment, with disagreement being limited to 6.8% of those in the 18–63 years age category.

In the suburban environment, although still a substantial majority, a much smaller proportion of respondents considered their nearest green space to be suitable for older people, with 67.6% agreeing and only 1.8% strongly agreeing. This is despite the suburban environment often being identified as the ideal place in which to grow old and being home to a large proportion of older people in Irish society (the inverse of the urban environment). Furthermore, the results suggest that the opportunity for older people to use their nearest green space may well be hindered by inappropriate (inaccessible/unappealing) design. Such inappropriate design may well result in older people choosing not to leave their homes and, in turn, adopting a sedentary and isolated lifestyle, potentially resulting in accelerated physical, mental and social decline (as discussed in Chapter 2).

In the rural environment, 79.6% of respondents either agreed (55.7%) or strongly agreed (23.9%) that their nearest green space is suitable for older people. The high proportion of respondents strongly agreeing across all age groups (18–34 years: 29.8%; 35–54 years: 27.3%; 55+ years: 18.2%) suggests that the types of nearest green spaces (namely patches of green area and canals and riverbanks) are deemed suitable for use by older people. Only 15.9% of rural respondents disagreed to any extent, thereby suggesting that linear green and blue networks and appropriate green spaces may adequately meet the needs of older people in the rural environment.

5.5.4 *The nearest green space is well used by locals*

In the urban environment, over 85% of respondents agreed that their nearest green space is well used by locals, with 20% strongly agreeing. This is despite

the nearest green space (for most, a public park) being, on average, further away from their residence than the nearest green spaces in the suburban or rural environments (patches of green space or river/canal banks). This compares with 67.6% of suburban residents agreeing, with 13.5% strongly agreeing. These proportions indicate that the nearest green spaces in the suburban environment are potentially less well used than those in the urban environment, despite being closer to residents' dwellings on average. This suggests that the "quality" or "functionality", and thereby the "appeal", of nearby green spaces dominated by patches/areas of grass of various sizes are less than those of public parks and other "green" destinations. In total, 77.8% of rural respondents either agreed or strongly agreed that their nearest green space is well used by locals, with this environment recording the highest proportion of respondents strongly agreeing that their nearest green space is well used by locals – 45.8%. This strongly suggests a very high use value placed on nearby green spaces and green and blue infrastructures in the rural environment.

5.5.5 *When?*

Respondents were asked to indicate when they last visited their nearest green space (Figure 5.19). The purpose of focusing on the nearest green space was to better understand the use of nearby green spaces, rather than visits to green spaces in general.

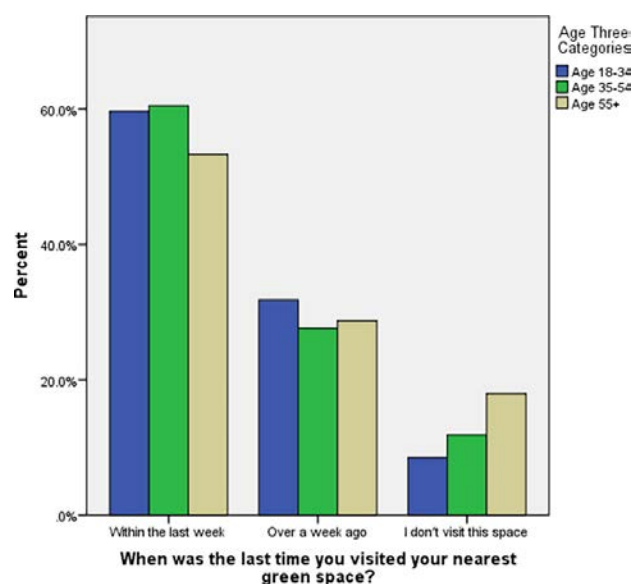


Figure 5.19. Last visit to the nearest green space by age cohort.

Despite this narrow focus, 57.6% of all respondents reported that they had visited their nearest green space within the last week and the majority of all respondents (57.1%) indicated that this is the green space that they visit most frequently. Only 13.2% of all respondents indicated that they never visit their nearest green space. Considering the data across age cohorts, fewer of those aged 55+ years visited their nearest green space within the last week than those in the 18–34 and 35–54 years age cohorts. There was little variation in the proportions of respondents last visiting their nearest green space over a week ago, with those aged 55+ years most inclined to never visit their nearest green space (Figure 5.19). Those aged 18–34 years were the most likely to indicate that their nearest green space is the green space they visit most frequently (18–34 years: 64.4%; 35–54 years: 54.0%; 55+ years: 54.0%).

Some notable differences can be seen when this analysis is undertaken by environment type. In the urban environment, 52.6% of respondents had visited their nearest green space in the last week (Figure 5.20). This compares with 57.6% of respondents in the overall sample. However, a slightly smaller proportion of respondents than in the overall sample reported that they never visit their nearest green space: 12.8% versus 13.2%. This simple analysis reveals that, although urban respondents were less inclined than the overall sample to visit their nearest green space within the last week, they were

more inclined to have visited at some point. Indeed, for 67.7% of urban respondents, this is the green space that they visit most frequently (compared with an average of 57.1% across the entire sample). Although in the urban environment the greatest proportion of all age cohorts had visited their nearest green space within the last week (18–34 years: 50%; 35–54 years: 53.8%; 55+ years: 62.5%), the responses suggest that those in the 55+ years age cohort were most inclined to have a fixed weekly behaviour, that is, they visit their nearest green space every week or they never visit (see Figure 5.20). Those in the other two age cohorts were most inclined to visit at some point if they did not do so within the last week.

In terms of visits to their nearest green space within the last month, the greatest proportion of urban respondents in the 18–34 years and 55+ years age cohorts reported visiting their green space 6 to 10 times per month (43.6% and 42.9%, respectively), whereas the greatest proportion of those in the 35–54 years age cohort reported visiting their nearest green space three to five times per month (34%) (Figure 5.21).

In the suburban environment, 56.9% of respondents had visited their nearest green space within the last week, a very close approximation of the average for the overall sample (Figure 5.22). This was similarly divided across age cohorts in terms of proportions. However, a higher proportion of suburban respondents than in the overall sample reported that they never

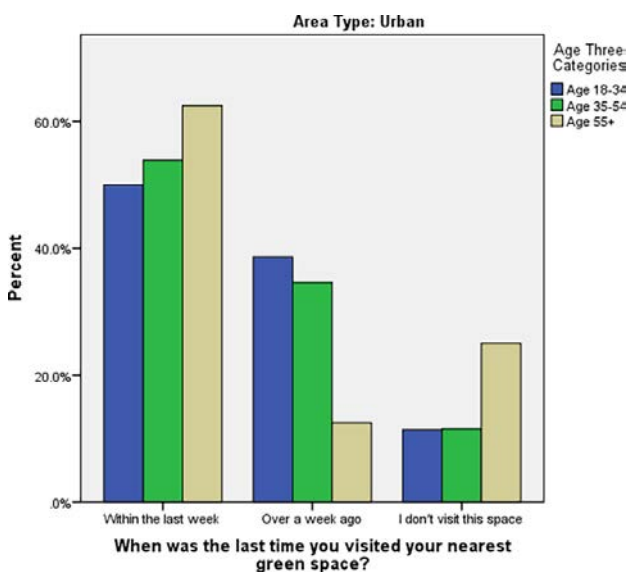


Figure 5.20. Urban environment: last visit to the nearest green space by age cohort.

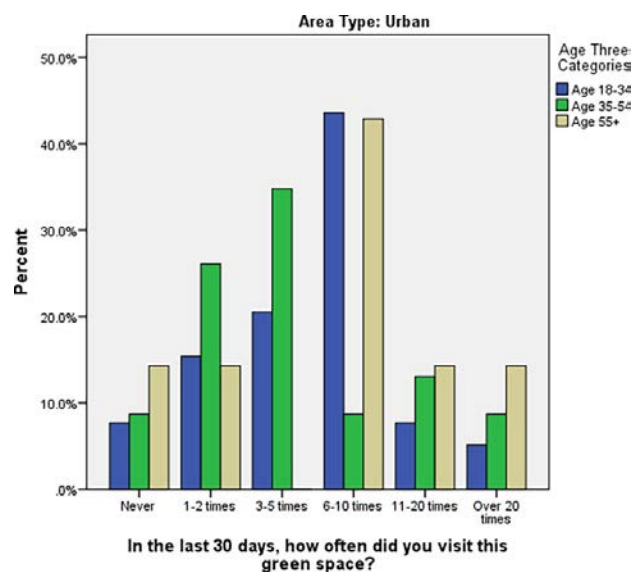


Figure 5.21. Urban environment: frequency of visits to the nearest green space by age cohort.

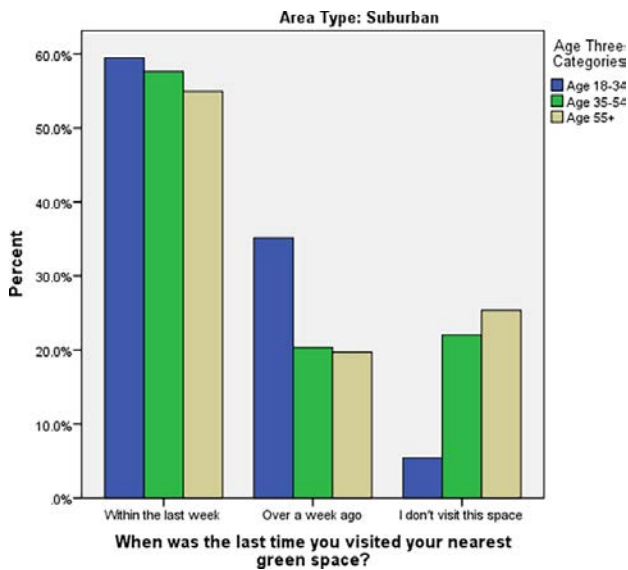


Figure 5.22. Suburban environment: last visit to the nearest green space by age cohort.

visit their nearest green space: 19.8% versus 13.2%. This might be explained to some extent by about half of the suburban respondents (49.3%) indicating that their nearest green space is not the green space that they visit most frequently; this was spread very evenly across age cohorts (18–34 years: 48.6%; 35–54 years: 46.8%; 55+ years: 51.9%). Of significant note is the variation between age cohorts, with between 22% and 26% of those aged 35+ years indicating that they never visit this space and only 5.4% of those aged 18–34 years offering this response (see Figure 5.22). This suggests that those in the 18–34 years age category visit multiple green space locations.

In terms of visits to their nearest green space within the last month, very few suburban respondents in the 18–34 years age cohort (2.9%) reported never visiting their nearest green space, with the remainder distributed rather evenly across the different frequencies of visits (Figure 5.23). The greatest proportion of suburban 35- to 54-year-olds (34%) reported visiting their green space 6 to 10 times per month, with a further 25.5% visiting 20 times or more in the last 30 days. Interestingly, the greatest proportion of those aged 55+ years in the suburban environment (29.6%) reported visiting their nearest green space over 20 times in the last 30 days, with the joint second most popular response being “never” (16.7%), thereby highlighting again the tendency towards a dichotomy between very active and very inactive members of this age cohort in the nearest green space (see Figure 5.23).

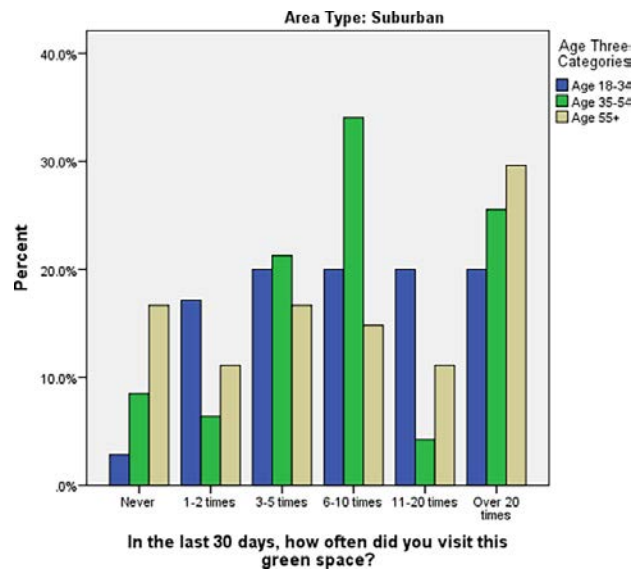


Figure 5.23. Suburban environment: frequency of visits to the nearest green space by age cohort.

In the rural environment, 60.1% of respondents had visited their nearest green space within the last week, slightly more than the average for the overall sample, but not substantially more. Rural respondents were much less inclined to indicate that they never visit their nearest green space than the overall sample – 7.9% versus 13.2% – potentially indicating a closer affinity or connection with the local environment. For 57.8% of rural respondents, this was the green space that they visit most frequently. Indeed, of those who did not visit their nearest green space within the last week, the vast majority (32%) did visit it over a week ago. Across age cohorts, a greater proportion in the younger age cohorts reported visiting their nearest green space within the last week (18–34 years: 68.8%; 35–54 years: 65.7%; 55+ years: 51.1%). Those in the middle cohort (35–54 years) were the most inclined to have visited their nearest green space either within the last week or over a week ago (97%), with those aged 55+ years the most inclined to never visit (18–34 years: 8.3%; 35–54 years: 3%; 55+ years: 11.4%).

In terms of visits to their nearest green space within the last, month, the greatest proportion of rural respondents in the 18–34 and 35–54 years age cohorts reported visiting their nearest green space over 20 times per month (31.8% and 29.7%, respectively), with those in the 55+ years age cohort more evenly spread across the response options (Figure 5.24). With the second most common response for the 55+ years age group in the rural

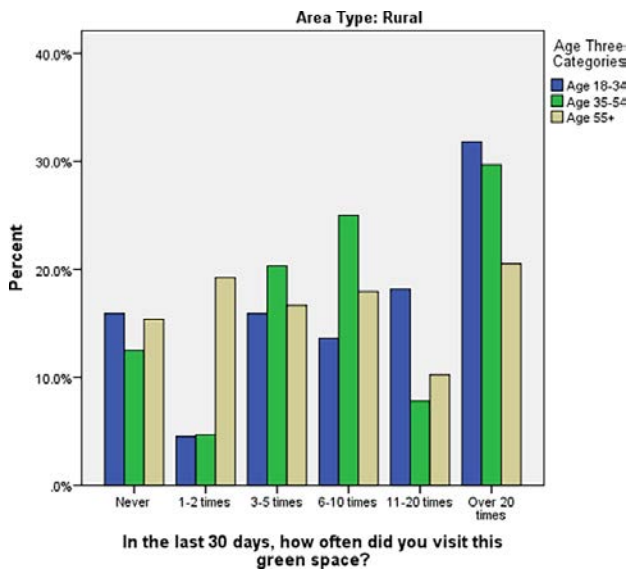


Figure 5.24. Rural environment: frequency of visits to the nearest green space by age cohort.

environment being one to two times per month, the dichotomy between locally active and locally inactive respondents aged 55+ years dissipates. Interestingly, although the proportional level of local inactivity (“never” responses) for the 55+ years age cohort across all environment types (urban, suburban, rural) remains relatively constant at around 15%, only in the rural environment did a similar response emerge for the other age cohorts. This clearly suggests that these proportions in these age cohorts may well frequent other locations in favour of their nearest green space (e.g. GAA pitches, indoor sports facilities).

5.5.6 Why?

Overall, 76.4% of respondents were satisfied (44.9%) or very satisfied (31.5%) with their nearest green space. A further 13.6% were indifferent (neither satisfied nor dissatisfied) and 10.0% were either dissatisfied (6.7%) or very dissatisfied (3.3%). Satisfaction with the nearest green space was proportionately similar when considered across age groups (Figure 5.25).

Across all three environment types, in accordance with the overall trend, the majority of respondents were either satisfied or very satisfied with their nearest green space (urban: 71.1%; suburban: 78.2%; rural: 76.7%) and trends were broadly similar across the three age cohorts. Only in the urban environment did no respondents indicate that they were “very dissatisfied” with their nearest green space, but this

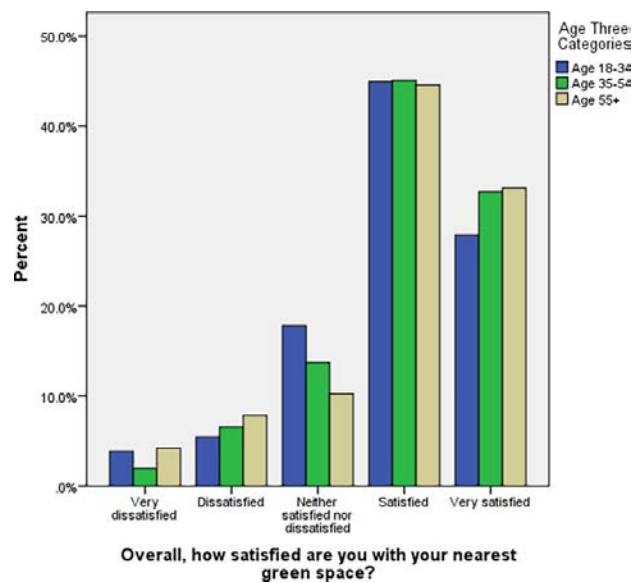


Figure 5.25. Satisfaction with the nearest green space by age cohort.

environment did record the highest level of indifference (neither satisfied nor dissatisfied – urban: 21.1%; suburban: 9.4%; rural: 14.4%). This suggests that the nearest green spaces are broadly considered satisfactory, but the level of indifference potentially indicates that these spaces are not necessarily frequented by many respondents, potentially as a result of their distance from respondents’ dwellings. In the suburban environment, a high level of dissatisfaction was largely limited to the younger and older age cohorts (8.1% of 18- to 35-year-olds and 7% of the 55+ years age cohort), with only 1.6% of 35- to 54-year-olds reporting a high level of dissatisfaction (being very dissatisfied). This suggests that there are deficiencies in the “quality” of the nearest green spaces and the “nature” of what they afford to younger and older groups, in particular. Implementing design changes to reflect desired attributes, as discussed earlier, would be an appropriate starting point to address such deficiencies.

5.6 Conclusion

To date, there has been a lack of policy and design guidance for the design of the public realm and, in particular, the provision of green infrastructure networks, which contribute to the health and well-being of the populations they are intended to serve. The preceding analysis has attempted to address this deficit in the Irish case by empirically investigating perceptions and use of the outdoor environment

by adults of all ages in urban, suburban and rural contexts. Ultimately, the purpose of the analysis was to better understand how residents of various environments and with a variety of socio-demographic backgrounds use the outdoor environment, with a particular focus on local environments. The intention of the analysis was to develop an evidential base for the increased usage of local green infrastructure, with a view to improving the health and well-being of populations across all settlement types.

In adopting a “Where? What? When? How? Why?” formulation, the design of the survey and the subsequent analysis have attempted to probe the reasons for use and non-use of existing spaces. In so doing, the “Why not?” is as important as the “Why?” in unpicking current behaviours and the potential use of green infrastructure in different environment types. The results clearly demonstrate the need for different design approaches for green space provision in different locales with different population profiles. A new approach is clearly necessary, given that only 31% of the adult population meet the weekly activity levels recommended in national guidelines on physical activity. The study found that green spaces and green infrastructures are key outdoor environments that are visited by residents of all environment types and all ages. In particular, high-quality green spaces and linking pedestrian infrastructures were identified as key features for health and well-being in all environments. Furthermore, quietness and green landscape character were identified as the over-riding characteristics of favourite outdoor environments.

The study found that, although most respondents valued the opportunities that their local environments provide for walking and cycling, they are not fully satisfied with the current provision of pedestrian infrastructure and walking routes. The kind of provision that would increase their satisfaction and potentially their usage varied by environment type and age cohort. Similarly, although respondents generally agreed that local green spaces were a positive feature of their local environment, the spaces are most valued for the “opportunities” that they provide to local residents, in terms of the experiences they facilitate for the enhancement of local quality of life (i.e. physical activity, recreation and social interaction), rather than for the non-experiential “monetary” values such as enhanced property prices.

What the analysis clearly highlights is the failure of extant green spaces to achieve their potential in terms of maximising the health and well-being of their proximate populations. Those involved in the design of the public realm and green infrastructure networks would do well to heed the findings of this study, with a view to approximating the characteristics of favourite environments and building in desired characteristics for increased usage in local environments according to the matrix provided. Environments must be responsive to their populations. This study provides a roadmap for action, clearly identifying pedestrian and green space networks as the fundamental base for a healthy settlement. Other more specific attributes can follow, depending on budget and other pertinent factors.

6 Eco-Health Choice Experiment Survey

6.1 Introduction

The main survey was followed by a shorter companion survey that included a DCE. A choice experiment is an environmental economic method that encourages people to choose between two alternative scenarios that consist of various levels of characteristics or attributes. The aggregate choices of respondents reveal their probability of choice – or preference – for each alternative and its constituent attributes. In *generic* exercises, the alternatives represent the same product, with the same attributes presented at different levels (e.g. seating, no seating). In *alternative-specific* exercises, the same class of product is presented (e.g. parks), but of a different type (e.g. small parks, big parks). In some alternative-specific exercises, a few attributes may also be different. In either case, the exercise forces people to choose between two alternatives. Economists believe that this process of choice conforms more closely to actual behaviour than the common method of eliciting of ranks or ratings.

The attribute levels are varied for each respondent through the use of an underlying statistical factorial design. This aims to present the respondents with an orthogonal, or balanced, combination of attributes, although this orthogonality can be varied to omit some illogical combinations or to permit over-representation of a particular combination for which a greater uncertainty of response is suspected. Altogether, the responses provide many data from which we can predict the probability of choice of an alternative or of any attribute level. This probability is akin to a quantified expression of preference. Ideally, we hope that each probability value will be statistically significant, although even slightly non-significant values are often of the expected direction and magnitude (although often the latter is small). As applied by environmental economists, the methodology is usually employed to determine the value of non-market public goods. However, if combined with an attribute, such as an entrance fee, a monetary value can be placed on each attribute. This is useful for cost–benefit analysis and for managers to decide how to allocate resources. Unfortunately,

including an entrance fee or similar monetary attribute is not a practicable proposition for parks and green spaces, as these destinations have always been visited for free. Instead, we have used distance/ journey time to further encourage people to make a trade-off between the attribute levels of the two alternatives. Journey time, like cost, is something that people typically aim to minimise. Potentially, this journey time can be converted into a monetary value by using Department of Transport, Tourism and Sport or other indices of people's value of leisure time.

In our case, we were interested in how people would choose between two alternative hypothetical parks or green spaces that contain some attributes that are related to well-being or physical exercise. Other attributes were included because they are known to be essential attractions of green space. These latter attributes were the setting or landscape, the presence of water (streams or lakes), the presence of a café, the presence of children's play facilities and distance/ journey time. The two attributes more closely linked to health were the option of accessing the green space via a greenway and the option of using looped trails (Table 6.1). Each of these attributes was represented by two or more levels. The survey was alternative specific in that one alternative (A) consisted of a local green space of the type that could be found close to home and the other (B) represented a town with larger park/green space. Piloting of the questionnaire suggested that the use of these two alternatives would add realism in that people make different journeys under different circumstances. The risk that people would always choose the better facilities of the town/central green space (B) was mitigated by the longer journey time. Longer journey times were over-represented in the factorial design to ensure a trade-off.

The attributes in the lightest green boxes (left) are for local parks, the mid-green attributes (right) are for town parks and the darkest green attributes are shared by both the local and the town park.

The choice experiment consisted of six choice sets drawn equally from 24 different designs (for example

Table 6.1. Choice experiment design

	Level 1		Level 2		Level 3		Level 4
Landscape	Mostly mown grass		Mown grass, meadow, clusters of trees		Grass, meadows and woods		Stream, lake (/river) and café
Water/facilities	No water features		Stream and small pond		Stream and lake (/river)		
Looped walks	No looped trail		Single looped trail		Several looped trails		
Play facilities	Small playground		Large playground				
Connection to shops, work, school or college, etc.	Access by road or roadside footpath		Linked by road and greenway for walking/ cycling				
Distance	5 minutes	10 minutes	15 minutes	20 minutes	25 minutes	30 minutes	

see Figure 6.1). In the initial survey in Banagher, respondents were asked to indicate only which park or green space they preferred (choice 1). However, as respondents here often chose just one type of park or green space in all six choice sets, this was supplemented in the Waterford survey by a second question (choice 2) asking people to indicate which of the two they would usually choose to visit considering (interviewer emphasis) the *distance*. The distance attribute was expressed in journey time given that people could choose to travel to parks or green space by foot or by car (or bicycle or public transport). It would be possible to convert these figures to a physical distance by using average urban walking and vehicle speeds.

The number of attributes in the choice experiment is restricted by the complexity of the factorial design that underlies it. Including more attributes would be more realistic, but requires a more complex design and a larger sample size, while also challenging respondents' ability to successfully complete the exercise. For respondents, the success of the exercise is a balance between being presented with meaningful and realistic choices and, at the same time, making sure that the choices are not too complex to compare. Consequently, "café" was linked in with water (although, in retrospect, it would have been better as a separate attribute). "Playground" was considered to be less relevant to adult health and exercise than some omitted attribute candidates, but was shown by the pilot survey to be a key factor for many people visiting parks or green space and so could not be omitted without making the exercise meaningless for them. The choice sets were accompanied by photographs of attributes such as greenways and by

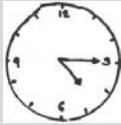
illustrated scenarios of different settings. The attribute icons in Figure 6.1 were available to complement the descriptions, for example by reminding respondents that landscape type also has implications for wildlife. Nevertheless, although the use of more attribute levels could have required a larger sample size, this would have been useful on reflection as some respondents did have problems distinguishing what they considered to be distinct differences between the two choices.

The survey was carried out in Banagher in June 2018 and in Waterford in June/July 2018. Because of the need to present many different choice sets, the exercise was implemented using tablets and a software program that pulled up a different set of exercises for each respondent. However, some interviews were also conducted using paper questionnaires. The underlying factorial design was prepared using Ngene software and the modelling was undertaken with NLOGIT.

6.2 Descriptive Statistics

The choice experiment sample was smaller than the main sample and, as such, cannot be meaningfully broken down in the same way by factors such as age. In terms of some of the socio-demographic statistics, there were significant differences between the Waterford and the Banagher samples (Tables 6.2–6.6). The former included sampling in the working-class suburb of Ballybeg and the central area (data are also available on where in Waterford respondents were from). By comparison, the rural community of Banagher contains a more homogeneous but older population, with surprisingly few people in their 30s. The Banagher sample was also smaller than that

Figure 6.1. Choice set example.

Choice set 1		Green space A	Green space B
Landscape		Mostly mown grass	Mown grass, meadows and woods
Features		Stream and lake	Stream, lake and café
Looped walks		No looped walk	Several looped walks
Play facilities		Large playground	Small playground
Type of connection to shops, work, school or college		Access only by road or roadside footpath	Access also by greenway for walking and cycling
Journey time		5-minute trip	30-minute trip

Which green space do you prefer?

☐

Which would you usually visit, noting especially the respective journey times?

☐

Table 6.2. Which of the following best describes your household?

Sample	Single person (%)	Couple (%)	Couple with young children (%)	Couple with older children (%)	Household of unrelated people (%)	Household of related people (%)
Waterford	20.1	24.7	27.3	4.5	5.8	1.3
Banagher	23.0	32.8	21.3	19.7	3.3	0

Table 6.3. How would you describe your current work (or previous work)?

Sample	Student (%)	Home-maker (%)	Manual (%)	Skilled manual (%)	Clerical/lower professional (%)	Managerial (%)	Professional (%)	Retired (%)
Waterford	10.4	15.6	3.9	11.0	7.1	9.1	22.1	14.3
Banagher	3.6	21.4	0	12.5	32.1	8.9	22.41	14.3

Table 6.4. Social class (as recorded by interviewer)

Sample	A (%)	B (%)	C+ (%)	C (%)	C- (%)	D (%)	E (%)
Waterford	22.1	13.0	10.4	8.4	11.6	7.8	2.0
Banagher	5.8	9.6	15.5	18.0	16.5	34.6	0

Table 6.5. Gender (as recorded by interviewer)

Sample	Male (%)	Female (%)
Waterford	33.1	63.0
Banagher	44.1	55.9

Table 6.6. Age (as recorded by interviewer)

Sample	Late teens (%)	20s (%)	30s (%)	40s (%)	50s (%)	60s (%)	70s (%)	80s (%)
Waterford	2.0	12.7	22.1	21.4	16.2	9.1	7.8	1.3
Banagher	1.8	3.6	5.4	41.1	5.4	21.4	16.1	5.4

for Waterford, with 63 and 154 responses obtained, respectively.

Most of the descriptive statistics around green space use and preferences support the findings from the main survey, although there are notable differences. For example, whereas 61.5% of respondents in the main survey reported visiting parks or green space at least once per week, the figure for the Waterford choice experiment survey was higher at 72.7% and for Banagher was higher still at 77.8%. Over half of these respondents (50.6% and 56.9%, respectively) had in mind *parks* when asked about parks and green spaces (for which the questionnaire was accompanied by illustrations of green open space, amenity spaces and linked open spaces/parks). These figures compare with 36.1% in the main survey (although coastal areas and canal/riverbanks were also listed here).

In Waterford, a large proportion (44.2%) of respondents referred to the central People's Park, but 16.2% also mentioned the Waterford Greenway, 4.5% the (Kingfisher) Ecopark and the remainder a variety of parks, green space or coastal locations. Of these, the People's Park is a fairly formal or traditional park that is generally well maintained with good facilities, but which does experience some anti-social behaviour such as outdoor drinking. The Greenway is a new and popular facility that is most attractive to walkers and cyclists and of which many local people are quite proud. The Ecopark is close to residents in

Ballybeg, but arguably rather featureless despite its name, although it does provide a good view and has an adjacent leisure centre and café. By comparison, respondents in Banagher almost exclusively referred to the two riverside locations, one being a green area with a small playpark and adjacent marina and the other being located across the bridge and providing a pitch-and-put course and a swimming area, while also being the start of an informal riverside walkway. A few people referred to more distant locations, but nobody specifically mentioned the other small areas of green space to be found in the town.

Asked in an open question what it was that most attracted people in Waterford to these places, peace and quiet and open space were mentioned by many people (11.7% and 12.3%, respectively), similarly to the main survey, along with naturalness, scenery and trees (altogether 17.5%). By comparison, in Banagher, walking was mentioned by many people (45.1%), along with relaxing (41.9%). These attractions were followed by water, socialising, naturalness and trees (altogether 51.6%). As has been noted, the rural town has a population that is relatively old. Nevertheless, although 21% of respondents did have young children, the playground was specifically mentioned only by four respondents. By comparison, children's play facilities were the single most frequently mentioned attraction in Waterford (15.6%), even though the proportion of respondents with young children is only slightly higher. Indeed, more people were often (35.7%) or

sometimes (23.4%) accompanied by children on their visits than were not accompanied (37.7%). The figures in Banagher were similar, with 39.3% of respondents often accompanied by children, 13.8% sometimes accompanied and 45.9% not accompanied.

With regard to specific activities, walking was the most commonly mentioned activity in Waterford, similar to the main survey (86.2% of interviews). This activity was followed by dog walking (19.5%) and walking or jogging (13.6%). A good proportion of people also visited the playground (10.4%), but a rather modest proportion cycled (2.5%), although this activity was more popular among younger people, with this proportion being the same as for sports participation or viewing. Of course, more people would also be regularly cycling outside parks. Many people combined these activities with secondary activities such as socialising (18.2%), with others selecting a park or open space as a lunch destination (9.7%), although the survey did include many visits to the People's Park, which is located near shops and offices. Likewise, in Banagher, walking (86.2%) and dog walking (12.1%) were the most commonly reported activities. The Banagher sample was relatively older and, notably, only one person engaged in walking or jogging. However, several participants did say that they walked into the centre of the town or to the park for exercise. Table 6.7 illustrates the percentages of respondents who would walk a longer route to visit friends or shops or to commute if it incorporated green space.

With regard to the relationship with health, parks and green spaces were seen as being places for "moderate" exercise by 46.1% of people in Waterford, with 29.9% considering their activities to involve "mild" exercise. The figures for Banagher were 49.2% and 38.1%, respectively. Only 12.3% of people in Waterford and 9.5% of people in Banagher, believed that they used parks and green space for "vigorous" exercise. These proportions are possibly close to expectations given the characteristics (e.g. relative

age) of the respective populations. Although the amount of vigorous exercise reported is low, and could be higher if these destinations are to contribute to significant reductions in cardiovascular and other diseases, any exercise and outdoor activity is positive. Most people in Waterford claimed to often walk, run or cycle for exercise (64.9%), with 23.4% doing so sometimes and 5.8% doing so rarely. In Banagher, only 14.8% often walked, ran or cycled for exercise, compared with 41.2% who did so occasionally and a sizeable 31.1% who did so rarely. Nevertheless, the figures for perceived fitness were very similar. In Waterford, just over half (51.3%) of respondents considered their fitness to be good, with 15.2% rating it as excellent, 30.9% rating it as fair and only 2.6% reporting it to be bad. For Banagher, the corresponding figures were 49.2%, 14.8%, 31.1% and 4.9%. By comparison, the high proportion of people in the main survey who admitted to never engaging in strenuous or even moderate exercise could suggest that most responses in the choice experiment questionnaire related to "walking" as exercise.

In fact, half of the Waterford respondents (49.4%) accessed their "usual park" on foot, whereas 39.0% drove, 2.3% cycled and 1.3% took public transport. The proportion who reported walking in Waterford was lower and the proportion who reported driving was higher than for the main survey, although the latter survey did refer to outdoor environments generally. The figures reported in Banagher showed a similar pattern, with 54% walking and 41% driving, but with nobody cycling or using public transport. Whatever mode people used, 54.5% of people in Waterford arrived at their preferred green space within 10 minutes, with 23.4% arriving within 5 minutes. A slight minority of people believed that they would go out of their way to use a park or green space to access nearby friends or relatives or go to the shops, work, school or college.

In Banagher, all areas of the town were surveyed, with 37.5% of respondents stating that the journey to their

Table 6.7. Would you go out of your way to use a park or green space to access nearby friends or relatives or go to the shops, work, school or college?

Sample	Yes (%)	Possibly (%)	No (%)
Waterford	42.9	5.8	44.8
Banagher	34.9	3.2	61.9

preferred green space would take 5 minutes or less, 30.4% reporting that it would take 10 minutes or less and 9.0% reporting that it would take 20 minutes or less; 19.6% of respondents reported that their journey would take more than 20 minutes. Here, only just over one-third of respondents thought that they would go out of their way to use a green space to access nearby friends or relatives or to go to the shops, work, school or college.

When asked what characteristics in the choice experiment had most caused them to choose either (hypothetical) local park A or (hypothetical) city park B, a high proportion of respondents in Waterford referred to proximity (often choosing park A in these cases) (Table 6.8). The figure is not as high as might have been hoped in terms of potential health benefits. Only three people valued a greenway in this regard, although this characteristic does emerge as significant in the choice experiment analysis. However, the highest proportions referred to trails (13.6%), followed by water (11.7%), including lakes (3.9%). Playgrounds, particularly large playgrounds, were also important (11.0%), as were various natural features such as meadows, trees, woods and nature (11.0%). The figures for Banagher are quite similar, but with a higher proportion of people referring to trees, nature and a café and a lower proportion referring to a playground.

Asked more openly about things that they liked, respondents in Waterford referred to many of the same attributes, including the importance of calming factors, such as relaxation, quietness, no crowds, open space (altogether 3.8%) and safety (3.3%), although others also mentioned places for children, for socialising and for exercise, including walking, dog walking and running. Factors that discouraged park and green space use typically conflicted with these factors and included anti-social behaviour, drug use and graffiti

(11.6%), dog fouling (5.9%), dirt/litter (7.8%), safety/safety for children (13.0%) and crowds (3.5%), as well as bad weather, poor facilities, early closure, time available and distance.

In Banagher, respondents referred most frequently to trees and nature (71.2%), followed by water (50.0%), walking (44.7%), greenways (20.2%), a café (17.6%) and looped walks (15.7%). Litter (18.8%), anti-social behaviour (16.7%) and poor maintenance (16.7%) were the factors that most discouraged park use in Banagher.

6.3 Choice Experiment Analysis: Waterford

6.3.1 Waterford sample

The 153 respondents in the Waterford sample provided a sizeable database consisting of 1836 rows of response data ($153 \times 2 \times 6$). A small number of respondents were considered not to have, or not to have fully, understood the exercise (nine and two, respectively); however, the omission of these entries did not markedly affect the output from the models.

6.3.2 Choice question 1

The data were analysed using a multinomial logit (MNL) model, which distinguishes the influence on green space choice of the deterministic variables (the attributes) from random effects. A simple first model run for choice question 1 of the choice experiment attributes, without any representation of attribute levels, revealed that water is perceived to be the most important attribute, followed by landscape, greenway and looped trails, with play facilities and distance being unimportant and not significant. This outcome is in line with the descriptive statistics. However, more

Table 6.8. Were there any particular characteristics that caused you to choose either park A or park B?

Sample	Characteristics							
	Mown grass	Meadow	Trees	Woods	Water	Stream	Lake	Café
Waterford	2	3	7	3	18	5	6	5
Banagher	8	4	14	1	30	10	4	16
	Trails	Playground	Large playground	Road access	Greenway	Proximity	Variety	Nature
Waterford	21	15	2	2	3	14	4	4
Banagher	22	1	5	0	5	14	2	8

insight is achieved by looking at the individual levels in Table 6.9, which indicates significant values for trees, a pond, a lake, a café, a loop, a greenway and journey time. The coefficients indicate how each attribute influences the choice of park A or B (the probability effect on choice). As noted earlier, these coefficients are often converted into a price attribute for monetary valuation in environmental economic analysis but, given the absence of entrance fees or another suitable payment vehicle, the journey time factor can be used instead for welfare analysis to provide common values for each attribute. The baseline or level 1 attribute levels are not given in the model output, but can be estimated simply from the sum of the other levels for each attribute because, together, each attribute's coefficients sum to 1. On this basis, all of the attribute levels except for distance and pond are positive. However, although the pond attribute level is negative at -0.310 this does not mean that ponds discourage people from visiting parks or green space, as the value is only relative to the lake and café attributes because of it being based on the sum of the coefficients for this attribute. It is less negative than no water, which has a value of -0.523. Distance is treated as a continuous variable and, as a disincentive to visit, is negative overall, as would be expected, although its coefficient indicates that distance is not much more or less influential than other attributes.

Based on coefficient size, a stream, lake and café are the most attractive features. A café is a feature only of the larger park B and, in practice, would not be a feature of most parks. The no water feature has the next highest coefficient, as noted above, and

represents the greatest single deterrent to park or green space use. A stream and small pond has the next highest coefficient and is also negative, but, as noted above, this is only relative to the higher coefficients attracted by a stream, lake and café. Indeed, a stream and lake have the next highest coefficient, indicating the strong influence of water on the decision to choose park B. Trees, greenway links, several looped trails, single looped trails, woods and a large playground all then have a positive influence in roughly this order. Playgrounds would, of course, have an influence only for parents or others accompanying children to parks.

Model fit is rather weak, at a log likelihood (LL) of -570 compared with that of -0.586 for a model containing only alternative-specific constants (ASCs). Once an ASC for green space type, i.e. local green space or town park, is included in the analysis, this constant is found to be significant, although its inclusion reduces the significance of other attributes. The constant of local green space is found to have a strong negative coefficient of -0.788 relative to that for town green space of +0.788. In other words, the greater facilities that are typically found in the town green space tend to attract more preferences (choices) despite the longer journey time. The coefficients for café (café, lake and stream) (0.266), trees (trees and meadows) (0.200), journey time (-0.152) and greenway (0.117) are the attribute levels that have the greatest influence on the choice between green space A and green space B (although café is consistently identified in this respect, but not statistically significant). Water featured at different levels in green space A and green space B,

Table 6.9. Choice question 1

Attribute level	Coefficient	Standard error	Significance
Mowed grass and trees	0.185***	0.070	0.008
Grass, meadows and woods	0.055	0.105	0.105
Stream and small pond	-0.310**	0.145	0.033
Stream and lake	0.246**	0.123	0.047
Stream, lake and café	0.594***	0.136	0.000
Single loop	0.080	0.068	0.241
Several loops	0.096	0.103	0.350
Large playground	0.043	0.052	0.408
Greenway	0.120**	0.053	0.022
Journey time	-0.110*	0.057	0.052

n=934; log likelihood (LL)=-0.570.

*Number of asterisks indicates strength of significance.

but this difference (i.e. small pond/lake) does not seem to have been sufficient to force a choice between A and B.

The modest reduction in LL compared with a constants-only model indicates that people preferentially chose the town park, i.e. green space B, based on the diverse mix of positive attributes it contained. This result is consistent with observations from the interviews, in which green space B was far more frequently chosen in response to question 1. Green space B's diversity made it more interesting. Only when respondents were presented with the more extreme distance did they face a meaningful trade-off, especially those people who typically travelled to a park or green space by car. In addition, many people enjoyed the exercise associated with walking to parks and often made a choice based on the presence of the greenway attribute for this reason. In practice, though, this does not mean that local parks are not valued as, during the pre-testing, many people expressed the importance of having somewhere local to walk, walk the dog or take the children (although residents of Ballybeg, in particular, often referred to the poor quality of their local green space, the absence of facilities, traffic severance and anti-social behaviour).

Removing the ASC does not result in any significant improvement in model fit, but does provide greater significance for the composite attributes. In this case, a café, a lake, a pond, trees, a greenway and journey time are all significant, with coefficients provided in Table 6.1. All attributes can have a positive influence

on health by encouraging people to use green space. A café, once again, has the strongest influence on choice, with a coefficient of 0.594 (significance 0%). Water attributes are also important and significant, as noted above. Of those attributes that encourage physical exercise, it is useful to note the positive influence of a greenway; however, walking loops in the model for choice question 1 appear (so far) to be not significant or influential for green space preference.

6.3.3 Choice question 2

Because central or town parks (green space B) contain more diverse facilities they tend to be more attractive. The results from the second choice question (Table 6.10) are interesting as actual use and the distance factor were emphasised in this question. These results provide for a stronger model than choice question 1, with an LL of -0.494, compared with -0.564 for the constants-only model. In this new model, the ASC of green space A (or B) is no longer statistically significant and is only a small influence in itself, with a coefficient of -0.041. Rather, all non-baseline attribute levels are positive, namely a greenway, several looped trails, a café and a large playground, with positive (but not significant) values also for pond (positive in this instance), woods and a single looped trail (except journey time). The poor significance of trees is of interest given the former relative importance of this attribute. By comparison, the baseline attribute levels are all firmly negative and deter visits to parks and green space.

Table 6.10. Choice question 2

Attribute level	Coefficient	Standard error	Significance
Mowed grass and trees	0.151	0.077	0.509
Grass, meadows and woods	0.133	0.114	0.244
Stream and small pond	0.213	0.157	0.178
Stream and lake	0.047	0.137	0.834
Stream, lake and café	0.260*	0.145	0.065
Single loop	0.103	0.073	0.159
Several loops	0.307***	0.116	0.008
Large playground	0.225***	0.060	0.000
Greenway	0.398***	0.059	0.000
Journey time	-0.385***	0.067	0.000
Local park (ASC)	-0.041	0.497	0.934

n=825; LL=-0.494.

*Number of asterisks indicates strength of significance.

It is useful to examine the influence of socio-demographic variables on green space choice and health by reducing the data into subsets where sufficient responses allow or by creating interaction variables with the choice set attributes.

Removing from the sample the parents of small children and others who often or sometimes accompany children to parks or green spaces has the expected effect of taking away the significance of the attribute of a large playground, although the attribute remains positive (0.103). A greenway (0.337) and journey time (−0.438) remain significant, although the latter has a more negative value than before, suggesting, perhaps, that parents either are more tolerant of distance or (more likely to) drive. A pond (0.367), trees (0.191) and (now also) several looped trails (0.180) attract high coefficients for the remaining sample of adults. A better way of demonstrating this relationship, while retaining the original sample size, is to include an interaction between the large playground attribute and the fixed parameter of an amalgam of the variables “have small children” (Q24) and “people often/sometimes accompanied by children” (Q21). This interaction is significant at 10% and its inclusion improves the model fit slightly to an LL of −0.478, whereas the coefficients for the other attributes are little changed.

For people whose green space activity (Q5) involves walking, a strong (0.388) and significant (10%) interaction is apparent with the presence of a single looped walk and a strong, but not significant, interaction is evident for the presence of a greenway. Interestingly, there is neither a strong nor a significant interaction with the presence of several looped walks, which could be because walking is a default response to the question “What do you like to do in parks or green space?” and may not indicate strong intent. There is, however, a very strong (0.508) and significant interaction between cycling and the presence of a greenway. There are also high coefficients for interactions between fast walk/jogging and the presence of a greenway, a single looped trail and several looped trails, although only the last of these is statistically significant, with a coefficient of 0.702. There is also a positive (0.780) and significant (1%) relationship between dog walking and the presence of several looped trails and a greenway (0.334, 5%),

but not with a single looped trail (as might have been expected for dog walkers). Altogether, these results suggest what these active population groups like in the way of facilities. This could alternatively be interpreted as suggesting that the presence of trails (especially more than one trail) encourage walkers and dog walkers and that the presence of greenways encourage cyclists and joggers. The self-reported level of personal fitness (Q22) and exercise level (Q23) might be expected to have a significant interaction with the presence of trails or greenways; however, there was no significant interaction between these attributes and people who claimed to walk, run or cycle for exercise.¹³ There is, though, a good (0.352) and significant (10%) relationship between people who rate their fitness as excellent or good and the presence of several looped trails.

Retaining the significant interactions in the model greatly improved the model fit to an LL of −0.195, but at the expense of some loss of significance for the attribute levels, although woods, a café, loops, a large playground, a greenway and journey time remained significant. Only the attribute of several looped trails, which is exclusive to the description of green space B, is a significant interaction or relationship with the choice of this alternative.

Of course, a key objective of the Eco-Health project was to identify what can be done to increase the amount of exercise carried out by older and less fit people. Few people described their fitness as “fair” or “poor”. However, using a subset of respondents over 54 years of age results in a model in which journey time, a greenway, a large playground and pond are significant whereas distance (−0.308) is less negative than for the entire sample. However, this subset is too small to be calculable and no attribute remains significant if the sample is reduced to include only those aged over 64 years. Once again, the use of interactions preserves the entire sample. An interaction between respondents aged over 54 years and trails is positive but not significant. An interaction with greenway is significant but negative (−0.285). The same pattern applies to people aged over 64 years, but with the coefficient on trails being negligible (and not significant) and that on greenway being significant but even more negative (−0.534). However, there is no sizeable or significant interaction with distance, nor

13 In retrospect, it might have been better to exclude “walk” from this question or to replace this with “fast walk”.

do there appear to be any significant interactions with other attributes.

For people belonging to social classes D or E, there is a negative but not significant interaction with journey time and greenway, although an interaction with single looped trail is positive but just insignificant and that with several looped trails is positive and significant. For people who walk to their usual park there is a positive and significant interaction with journey time (0.165), suggesting that the walk is an enjoyable experience in itself. The average journey time for people walking was 6.4 minutes whereas that for people travelling by car was 5.6 minutes (3.8 minutes if some longer journeys, for example to Tramore, are omitted). The SD was similar in the two cases. Short(ish) distances are therefore not a deterrent for people walking, although they appear to be less willing to take on several looped trails once they arrive, as this attribute is significant and negative (−0.400). The interaction with greenway is not significant. However, it might be car drivers who we want to get walking or cycling to achieve better physical health outcomes. Car drivers, conversely, appear to have a positive (0.473) and significant relationship with several looped trails, possibly because they are willing to drive to (or prefer) those larger parks that have this facility or are less tired on their arrival. The interaction with journey time is negative in this case, but there is no significant relationship with greenway, as we might have hoped if we wish to encourage drivers to leave their cars behind and walk or cycle using greenways. Many car drivers will be taking their children to a park or green space and the interaction with trails becomes stronger once respondents with small children are removed from the sample. However, there is still an insignificant interaction with greenway, although if we produce a subsample of just drivers, greenway remains positive (0.408) and significant, as for the main sample.

6.3.4 *Random parameters logit model*

A random parameters logit (RPL) model is a means to explore the degree of variation between respondents in the sample, the sources of this heterogeneity and its relationship with particular attributes. The analysis is performed by simulation rather than by integration. For this approach, looped walks, greenways and journey time are the three attributes for which we are most interested from the perspective of health.

Including age as a continuous variable in the model confirms the earlier observation of small but significant heterogeneity in the mean coefficient for greenway (−0.012, 10% for a normal distribution), which becomes negative with increased age. This is further supported by a significant SD for this attribute. A significant coefficient is also apparent for journey time, but although this is positive the value is very low (0.006, 5%), with no significant SD being apparent. A single looped trail (and several looped trails) does not show significant variation with age (Table 6.11). The use of a normal statistical distribution for the random variables (i.e. the modelled attributes) performs best, although uniform or triangular distributions do not seem to affect the output very much. Essentially, the model reveals some heterogeneity as a result of age, but finds that this is not a major factor and does not greatly enhance the MNL model.

For the variable of social class, significant heterogeneity appears to arise for several looped walks (0.242, 10%), greenway (0.133, 10%) and journey time (0.053, 10%), although a significant SD is apparent only for greenway. The data, however, are subjective, with few respondents being listed by the interviewers as belonging to social class D or E, despite some sampling in Ballybeg. Further analysis of place of residence might help in this respect. No significant heterogeneity is apparent for the variable of detour, i.e. willingness to use a green space to access shops, etc. (Q9), and greenway or journey time. Although there is once again a significant SD for greenway, this does not appear to be linked to answers to the detour question.

6.3.5 *Summary*

Overall, it seems that older or less fit people do not have a preference for the notion of walking trails or greenways; this is perhaps not surprising given that there is no guarantee that this subset will be attracted to facilities that imply exercise. People (including perhaps some older people) might have an unfavourable view of greenways because of anxieties over cyclists or personal safety. As for drivers, this subset cannot be assumed to be unfit as many will have chosen to visit more distant parks or green space with more facilities, including facilities for exercise, or may simply prefer to exercise by using looped trails once they arrive at a park or green space. The value

Table 6.11. The RPL model showing the effect of age on the choices of looped trail, greenway and journey time

Attribute level	Coefficient	Standard error	Significance
Random parameters			
Single loop	0.188	0.311	0.546
Greenway	1.28**	0.530	0.016
Journey time	-0.720**	0.281	0.010
Non-random parameters			
Mowed grass and trees	0.147	0.131	0.260
Grass, meadows and woods	0.342*	0.180	0.057
Stream and small pond	0.338*	0.237	0.153
Stream and lake	0.027	0.192	0.887
Stream, lake and café	0.246*	0.133	0.092
Several loops	0.337**	0.153	0.028
Large playground	0.330***	0.114	0.004
Heterogeneity in the mean			
Looped trail/age	0.000	0.006	0.963
Greenway/age	-0.012*	0.007	0.098
Journey time/age	0.006*	0.003	0.069
SD			
Looped trail (normal distribution)	0.028	0.444	0.949
Greenway (normal distribution)	1.086**	0.515	0.034
Journey time (normal distribution)	1.97	0.394	0.617

$n=767$; $LL=-0.0454$ (restricted $LL=-531$).

*Number of asterisks indicates strength of significance.

of local parks (green space A), although inevitably having less diverse facilities than larger parks (green space B), is that they are seen to encourage walking to the park, which, for many people, is a positive experience. Fitter people clearly do appreciate trails and greenways. It is not clear if people who are already fit seek out these facilities, or if the introduction of such facilities encourages people to *become* fit, but there is evidently a positive relationship. Water facilities are rather left out of this question as they featured in both park A and park B. In themselves they do not provide for exercise, but are often the most important attribute and so do clearly encourage visits to parks and green space.

6.4 Banagher

6.4.1 Choice question 1

The Banagher sample was smaller than that for Waterford, with 63 responses or 378 (6 × 63) rows of data for the choice experiment. The analysis of choice

question 1 reveals significant values for pond, river, café, greenway and journey time (river was used in Banagher rather than lake, given the attraction of the River Shannon) (Table 6.12). All of the attribute levels are of an expected magnitude, with journey time and pond being negative. As before, the negative value for pond (-0.416) does not mean that ponds discourage people from visiting parks or green space, but that a river and a café are valued more. As in Waterford, the coefficient on journey time is modest and journey time is not much more or less influential than other attributes.

Based on coefficient size, river and café is the most attractive feature. The no water feature is again the next highest coefficient and represents the greatest single deterrent to park or green space use. This is not surprising given the attraction of the River Shannon and, indeed, river has the next highest coefficient. Single looped trail, journey time, greenway, several looped trails, large playground, trees and woods have the next highest coefficient values, in this order.

Table 6.12. Choice question 2: Banagher (without ASC)

Attribute level	Coefficient	Standard error	Significance
Mowed grass and trees	0.078	0.114	0.244
Grass, meadows and woods	0.059	0.077	0.509
Stream and small pond	-0.416*	0.157	0.178
River	0.350**	0.137	0.834
River and café	0.532***	0.145	0.065
Single loop	0.198	0.073	0.159
Several loops	0.083	0.116	0.008
Large playground	0.076	0.060	0.000
Greenway	0.153*	0.059	0.000
Journey time	-0.192**	0.067	0.000

$n=361$; LL = -0.230.

*Number of asterisks indicates strength of significance.

Woods and trees are valued positively, but rather less so than in Waterford.

Model fit is modest at an LL of -0.230, compared with an ASC-only value of -0.240. Once an ASC for park type is included in the analysis, this is significant and, in the case of green space B, is positive, although its inclusion provides no improvement on model fit at -0.230. The constant of local green space has a significant negative coefficient of -0.285, which is less than those for river and café (0.434) and river (0.299) and similar to that for journey time (-0.223).

The modest reduction in LL compared with a constants-only model indicates that people preferentially chose the town green space, as was the case for Waterford. Green space B's diversity once more made it more interesting, but respondents in Banagher almost exclusively had in mind the existing town parks beside the River Shannon, in the absence of other green space in the town other than playing fields and small pockets of residential green space. In addition, many people mentioned that they often enjoyed the entirety of their walk to the park, often visiting shops or other destinations along the way. This could be a reason why journey time has a lower negative coefficient than in Waterford. A significant proportion (44%) also travelled to the green space by car, but vehicle trips were also made by some respondents to more distant destinations, such as Lough Boora. The concept of an urban greenway was unfamiliar, although a few people did refer to defunct proposals for a rural greenway using the route of a previous railway between Banagher and Ferbane or Shannonbridge.

6.4.2 *Socio-demographic influences on preference*

As the sample size was already quite small, it was not helpful to analyse subsets; instead, relationships between socio-demographic characteristics were analysed using interactions and an RPL model. In this case, there is no significant interaction between the large playground attribute and the fixed parameter of an amalgam of families with small children and people often/sometimes accompanied to a park by children, nor is there a significant interaction between this same attribute and families with small children alone or people who are often/sometimes accompanied by children. This is not surprising given the low coefficient for large playground and its non-significance.

In the Banagher survey (table 6.4), there is no significant interaction between people who walk and the presence of a single looped walk, several looped walks or a greenway. There are too few people who fast walk or jog ($n=1$) or dog walk ($n=7$) to include these responses as an interaction. Perceived exercise activity and fitness might be expected to have a significant interaction with trails; however, there is no significant interaction between this attribute and people who claimed to often walk, run or cycle for exercise. However, there is a significant interaction with greenway (0.465, 10%), indicating that such respondents' green space choices are influenced by the presence of such a facility. However, there is also a good (0.321) and significant (5%) relationship between people who rate their fitness as excellent or good and looped trail and several looped trails (0.581, 2.5%), but not with greenway. There is also a positive (0.252) and

very significant (2.5%) relationship between this same subset and journey time for people who walk to their usual green space, even though journey time itself becomes more negative (-0.375 , 2.5%), as would be expected. In this case, retaining the significant interactions with looped trail and greenway improves the model fit only slightly, as doing so removes some of the significance from the component attribute levels, although river, river and café, pond, walking loops and journey time remain significant. However, model fit is improved to -222 with an interaction between fitness and several looped trails.

In Banagher, there is no significant interaction between respondents aged over 54 years and looped trail or greenway, but there is a significant and sizeable interaction with several looped trails (0.421 , 5%), which improves the model fit to -216 . The same pattern applies to people aged over 65 years, although the coefficient on the interaction is slightly less (0.404). There is no sizeable or significant interaction between age and journey time, although the attribute itself does become more influential (negative) with the inclusion of this interaction. There do not appear to be any other significant interactions between age and other attributes.

There were too few people in the Banagher sample belonging to social classes D or E to analyse this characteristic further. For Banagher, there was no significant interaction between people who walk to their usual park and journey time, although several people reported that having the opportunity to walk was part of the overall park experience. The average journey time for people walking was 5.8 minutes, whereas that for people travelling by car was 3.3 minutes (excluding those travelling to outside green spaces such as Lough Boora or the Slieve Blooms). As with the Waterford sample, car drivers have a positive and significant (0.105 , 5%) relationship with several looped trails, perhaps again because they are willing to drive to (or prefer) green spaces that have this facility. Again, there is no significant interaction with greenway.

6.4.3 Random parameters logit model

Using an RPL model to explore the influence of looped trails, greenways and journey time, an initial model with actual respondent age has a poor R^2 , but does hint at significant heterogeneity, i.e. has significant

SDs within the whole sample for looped trails, greenways and journey time. Noting that the Banagher sample is fairly homogeneous in terms of social class, this suggests other sources of preference variation, even if age is not a factor. A categorical representation for people aged over 54 years also fails to reveal any significant heterogeneity due to this attribute. Walking, running or cycling for exercise do not appear to introduce any significant heterogeneity to green space preferences; however, there is evidence of significant heterogeneity between people who rate their fitness as excellent or good and journey time. This supports the earlier observation that people who walk to their usual green space tend to rate their fitness highly, even though it is to be expected that they will be discouraged by longer distances.

6.4.4 Summary: Banagher

The smaller size of the Banagher sample does appear to have affected the results of the choice experiment. The size of the sample is at the minimum for performing this methodology. The use of only a single question for each choice set, and one that did not emphasise more strongly either use or journey time, meant that the analysis was similar to choice question 1 for Waterford. Significant values were obtained for the water attributes, whereas those for greenway and journey time were significant but less influential on choice. A significant relationship was apparent for those respondents who typically walk to their usual green space and who consider their fitness to be excellent or good. There was a strong positive interaction between self-reported level of fitness and preference for several looped trails. Likewise, there was a positive interaction between respondents aged over 54 years and preference for looped trails. This relationship does not guarantee the direction of cause and effect, but it seems likely that a positive response could follow from including looped trails in parks or green space.

6.5 Conclusions

Of the two choice experiment surveys, the larger sample in Waterford provided the firmer conclusions. The sample in Banagher also appeared to be more homogeneous. Both surveys revealed the importance of water as an attribute that attracts people to green space, although a few respondents did express

concerns about children's safety. The importance of water is, we assume, a positive factor from the perspective of both physical and mental health and well-being. The presence of a café also helps in that it provides an additional reason to visit a park or green space and a place for social interaction, although it is accepted that not all parks and green space can practically accommodate a café.

Natural surroundings, such as meadows, trees and woods, are attributes that appear to behave similarly to water in attracting people to parks and green spaces. Open space (including, sometimes, specifically mowed areas) was also mentioned by some people, particularly for children's play. Meadows and trees were a significant attribute in Waterford. In the non-choice set questions many people referred to nature as a factor that attracted them to parks and green spaces. Nature was not an overt attribute in the choice sets, but more natural and varied landscapes are an element of "nature" in themselves and also provide habitats for wildlife. These landscapes would also be a more appropriate setting for various forms of trails.

Of those attributes that more directly stimulate health benefits, namely looped trails and greenways, the presence of looped trails, and several looped trails in particular, does seem to have a positive relationship with self-reported levels of fitness. Several looped trails also have a significant and positive relationship with dog walking, fast walking and jogging, as well as with cycling. It is possible, of course, that exercise walkers and cyclists visit parks or green spaces only when these facilities are provided, but it could also be that the introduction of such facilities would induce more physical activity. This could be the case even though people who are less fit, or who belong to more vulnerable social classes, appear, in the first instance, to be less receptive to such facilities.

Receptiveness depends on familiarity with these facilities. Greenways, for example, are found to be popular with cyclists for obvious reasons. However, despite the use of greenway images in the survey, many people would have been unfamiliar with the concept of greenways, given that there are so few examples within urban areas in Ireland. Greenways were less popular among older people, possibly because of perceptions of conflicts with other users, such as cyclists. Greenways are also sometimes associated with crime, which may be another factor of concern for older and more vulnerable people. On the other hand, a large proportion of people claimed to usually walk to their preferred green space. Some also described this walk as being part of the green space experience. In addition, latent support for greenways may be evident from the fact that more than half of the respondents were willing to use a park or green space as a means to get to a regular destination, such as the shops or a workplace, even if this meant a small increase in journey time. Similarly, water, specifically streams or rivers, is by its nature linear and can be included as a feature of greenways.

In most cases, the choice experiment results were consistent with responses to the other questions in the survey. Strong preferences were evident for water and nature, but also for the provision of varied facilities (or many kinds of facilities). The success of including facilities, including facilities to encourage exercise or social interaction (or quietness and relaxation), is dependent on providing for safety (including children's safety). It is also important to ensure that, if green space is to provide health and well-being benefits, it should also be well maintained and free of anti-social behaviour or litter.

7 Responsive Environments: An Outline of a Method for Determining Context-sensitive Planning Interventions to Enhance Health and Well-being

7.1 Introduction

This chapter seeks to further explore green space attributes through a community engagement approach that aims to “co-design” pathways to healthier environments and lifestyles. As outlined in Chapter 3, our approach is not to focus on the equitable distribution of green space “goods”, but rather to focus attention on the “use desires” of those using green spaces. This approach recognises that, although quantifiable measures of access are useful, this often fails to account for the health benefits afforded to different users by different *types* of green space distributions and configurations (Velarde *et al.*, 2007; Bowler *et al.*, 2010; Jorgensen and Gobster, 2010; Hartig *et al.*, 2014).

In other words, although well intentioned, measures of green space access often foreground “means” (e.g. proximity to green space) over “ends” (e.g. the varying aspirations of green space users) in the planning of interventions for health and well-being, thus risking that the contextual contingencies of user aspirations are overlooked (Kaczynski and Henderson, 2007; Sugiyama *et al.*, 2010; Edwards *et al.*, 2014). Put differently, such a deontological approach grounded in a “justice as fairness” framework is generally concerned with the distribution of “good things” as a measure of an equitable distribution of opportunity, rather than in the *actual* role that these good things may serve in providing people with the opportunity to realise *their* aspirations. Consequently, there is often a focus on ensuring equity in “what” is introduced “where”, with less attention allocated to a detailed consideration of “why” an intervention is introduced relative to the spatial aspirations of the users at “whom” it is targeted (Lennon *et al.*, 2017). In part, this may be attributed to problems in translating an abstract and institutionally focused political philosophy of justice into specific and applied planning and design practices (Campbell, 2006). Nevertheless, the ultimate consequence of this difficulty may be the formulation

of initiatives aimed at enhancing health and well-being that have little effect, resulting from their lack of responsiveness to the use desires of the communities that they are supposed to serve (Anguelovski *et al.*, 2018). Therefore, what is required is a framework that respects and responds to contextual issues in the determination of what health and well-being interventions best serve the specific needs and desires of a community. One way to achieve this is by mobilising the application-focused philosophy of Amartya Sen in devising a method for determining user needs and desires.

Although often acknowledging his debt to the philosophy of Rawls (Sen, 1992, 2004), Sen has been critical of the Rawlsian focus on “means” (“goods”) at the expense of “ends”, as he believes that such an approach “seems to take little note of the diversity of human beings” (Sen, 1980, p. 215) and, in particular, the variety of different “ends” (aspirations) that people may hold. Indeed, in seeking to account for such diversity, Sen inverts the abstract and top-down philosophy of Rawls through proposing an alternative trajectory of bottom-up applied thinking that directly responds to the variety of human desires and capacities. Hence, whereas Rawls’s underlying question is “what would make human beings equal regardless of their residual diversity”, Sen’s underlying question is “what would make human beings more equal in consideration of their inherent diversity” (Basta, 2015, p. 199).

It is in this context that Sen advances a “capability approach” (CA) that focuses on the “ends” that people may hold in terms of their desired “beings and doings” (Robeyns, 2005), expressed in general terms such as “being part of a community”, “being able to easily access a nearby pleasant environment” or “being able to walk alone in a secluded green space”. Importantly, Sen does not view the CA as overturning the work of Rawls. Rather, he contends that the CA “can be seen as a natural extension of Rawls’s concern with primary

goods, shifting attention from goods to what goods do to human beings” (Sen, 1980, p. 219). As such, the CA offers scope to address issues concerning the contextual responsiveness of planning interventions arising when the abstractions of Rawlsian theory “walk into the world” (Basta, 2015, p. 197). Accordingly, this chapter presents and discusses a CA-informed method for determining responsive planning interventions to enhance the health and well-being-supporting qualities of residential environments. The next section outlines the CA. A brief overview of affordances theory is then provided and an explanation is supplied as to how these affordances can be integrated in formulating a coherent conceptual framework. The CA-informed method is then detailed. Following this, the method is applied to three exploratory case studies as a means to illustrate its advantages. The chapter closes with some summary conclusions on the benefit of this approach.

7.2 The Capability Approach

The extensive publications and presentations by Sen (2001, 2005, 2009, 2013) and others closely associated with the CA (Nussbaum, 2000; Oosterlaken, 2015) may mislead one to assume that the CA wholly concerns poverty alleviation, development and human rights issues in the global south. However, there are conceptually or normatively no grounds to restrict the scope of the approach to such topics or these locations. Indeed, recent research has demonstrated the applicability of the CA to planning and design issues better aligned with experiences in more affluent countries (Wolff and de-Shalit, 2007; Basta, 2015). In this context, it is important to note that the CA presents a broad and flexible framework rooted in an attempt to acknowledge and respond to human diversity, rather than a precise political or moral theory of emancipation or justice (Sen, 2002; Qizilbash, 2012; Hick and Burchardt, 2016). Likewise, it is important to note that the CA is not intended as an “explanatory” framework, as it does not seek to identify the determinants of a phenomenon. Instead, the CA furnishes a conceptual framework to guide evaluative and normative analyses, wherein the consideration of relative values (e.g. better or worse) is used to inform prescriptive stances on what ought to be done and why (Robeyns, 2017). Specifically:

The capability approach evaluates policies according to their impact on people’s capabilities. It asks whether people are being healthy, and whether the means or resources necessary for this capability are present (Robeyns, 2005, p. 95).

From this examination, policies can be devised or revised to enhance the capability that people have to be healthy. Hence, in the context of planning, “thinking of capabilities *in* places means shifting from thinking in terms of *city* development to thinking in terms of *human* development” (Basta, 2015, p. 208). To realise this, the CA framework has a number of key conceptual elements. To the fore of these are “functionings” and “capabilities”.

As contended by Sen (1985, p. 197), “The primary feature of well-being can be seen in terms of how a person ‘functions’, taking the term in a broad sense.” For him:

A functioning is an achievement of a person: what he or she manages to do or be. It reflects, as it were, a part of the “state” of that person. It has to be distinguished from the commodities which are used to achieve those functionings ... It has to be distinguished also from the happiness generated by the functioning ... A functioning is thus different from (1) having goods (and the corresponding characteristics), to which it is posterior, and (2) having utility (in the form of happiness resulting from that functioning), to which it is, in an important way, prior (Sen, 1999, p. 7).

Therefore, living in proximity to a green space is not a “functioning”, as it is not something that a person manages to do or be; it is simply the measure of a geographical relationship. In this case, a focus on “functionings” would instead seek to evaluate the level of achievement (functioning) of a desired activity or state being facilitated by living in proximity to a particular green space. Here we see the inversion placed by Sen on the Rawlsian focus on means–ends relationships in the distribution of “goods”. For Sen, a focus on measuring the distribution of “goods” risks generating a means–ends policy focus (e.g. ensuring equity in proximity to green space) that masks the real benefits (“ends”/“functionings”) that people seek from

those “goods” (e.g. birdwatching, jogging, picnicking). Sen thereby reasons that greater weight should be laid in policy formulation on identifying the contextually sensitive “functionings” (“ends”) that people seek from “goods”. On this basis, policy design should be orientated towards helping people realise these aspirations. In essence, he proposes reversing the direction of how policy is conceived, from a “means–ends” emphasis to an “ends–means” trajectory (Figure 7.1).

Whereas functionings are the “beings and doings” of a person (Robeyns, 2017, p. 91), Sen (1992, p. 40) conceives somebody’s “capability” as “the various combination of functionings that a person can achieve. Capability is thus a set of combinations of functionings, reflecting the person’s freedom to lead one type of life or another.” Thus, although a person’s functionings and capabilities are closely related, they are viewed as conceptually distinct within the CA framework so as to assist in the development of coherent approaches to policy formulation. In this context, Sen (1987, p. 36) explains that:

A functioning is an achievement, whereas a capability is the ability to achieve. Functionings are, in a sense, more directly related to living conditions, since they are different aspects of living conditions. Capabilities, in contrast, are notions of freedom, in the positive sense: what real opportunities you have regarding the life you may lead.

Accordingly, the relationship between functionings and capabilities is one of that between outcomes and opportunities. As noted by Nussbaum (2011, p. 25), “Functionings are beings and doings that are outgrowths or realizations of capabilities.” This conceptual framework allows Sen (1993) to delineate between, evaluate and prescribe policy aimed at what he terms “well-being achievements” and “well-being freedoms”. Specifically:

A person’s position in a social arrangement can be judged in two different perspectives, viz. (1) the actual achievement, and (2) the freedom to achieve. Achievement is concerned with what we manage to accomplish, and freedom with the real opportunity that we have to accomplish what we value (Sen, 1992, p. 31).

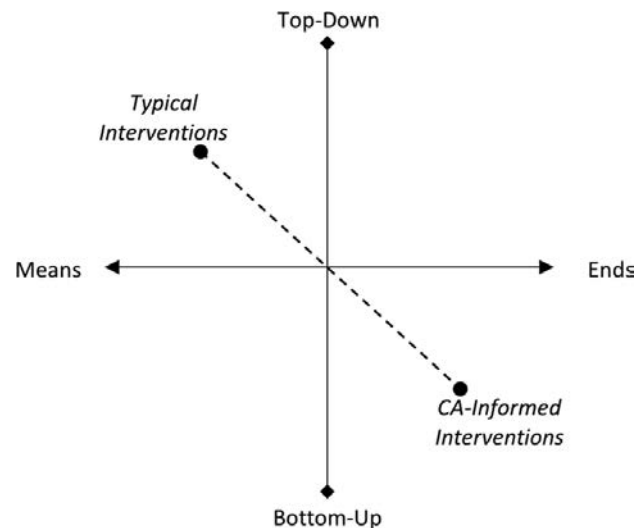


Figure 7.1. Diagrammatic representation of the relationship between the trajectory of intervention identification (y-axis) and evaluative foci (x-axis).

Hence, when formulating policy and endeavouring to evaluate its success, a Senian approach would involve (1) establishing what particular functionings are being targeted and (2) how this set of functionings work in enhancing the opportunities to realise that which is valued by the cohort at whom the policy is addressed.

As such, policy design requires an appreciation of the characteristics and aspirations of those for whom the policy seeks to serve. Sen thereby proposes the concept of “conversion factors” as a way to contextually conceive how people and communities may respond differently to the availability of “goods”. Such conversion factors are what enable people to “convert” means (goods) to “ends”, thus profiling their capabilities. In this way, the conceptual apparatus of conversion factors enables Sen to push beyond a focus on the “goods” available to a person, towards a more nuanced understanding of “what” these goods may do for people and “how” they are facilitated or hindered in doing so. Therefore, in the context of planning for health and well-being, the focus of a CA analysis is not, for example, simply on proximity, exposure or access to green space, but is expanded to lay emphasis on the relationship between the person and the particularities of that space, as mediated by a series of interacting conversion factors in facilitating or hindering the realisation of desires (or even stimulating the emergence of new desires). Three such conversion factors are proposed by Sen (1992). First, personal conversion factors influence how a person can convert a good into a “functioning”. For example,

physical ability/disability, or a sense of vulnerability because of age or gender, may influence a person's perceived capability to convert the good of green space proximity into green space use. Second, social conversion factors refer to how social forces, such as societal perceptions, public policies and discriminating practices, may have real effects on well-being by, for example, helping or hindering the capability of people to convert the good of green space proximity into a diversity of desirable green space uses, such as park management strategies aimed at curtailing anti-social behaviour that involve closing green spaces to the public at dusk. Third, environmental conversion factors describe physical influences on a person's capability, such as the lack of certain park attributes needed to facilitate desired activities, for example a cycleway, secluded garden area or playing pitch.

Acknowledging these conversion factors in the formulation of policy and design interventions means having an appreciation that it is not adequate to simply ensure the provision of "goods", such as outdoor gym equipment in public parks. Instead, it requires that planners attend to issues of desire and circumstance. Hence, it necessitates a move beyond a "thin" theory of general consensus as a basis for planning activities that may be contextually detached (Stein and Harper, 2005) and towards a more responsive "thick" conception of how to advance health and well-being that is sensitive to the contexts of individuals and communities. The advantage of the CA is that it supplies the conceptual tools needed to formulate interventions that, in their context sensitivity, respond to the complex needs of real people in actual situations. Nevertheless, Sen has been vague with respect to how the set of functionings and related capabilities to be advanced in policy is to be selected, beyond recommending in general terms that some form of democratic process should be involved. Indeed, to a large extent it has been left to the secondary literature to work through ideas on how to select and sequence what functionings and capabilities are targeted for whom and in which ways (Crocker and Robeyns, 2009). Although some progress has been made in developing macro-level social choice procedures in the context of mobilising the CA in developing nations (Chakraborty, 1996), there remains a deficit of applied research into the potential of the CA to assist planning for health and well-being in affluent Western settings (Basta and Moroni, 2013). It is in this context that affordance theory supplies a

means to conceptually relate the specific attributes of an existing environment and/or a planning intervention to conversion factors, and subsequently to the functionings and the capabilities that are facilitated.

7.3 Affordances Theory

Prevailing approaches in planning typically conceive the "perceiver" as an "observer" rather than an active participant in the configuration of themselves and the environment in which they are positioned. It is from this perspective that much environmental preference-based research implicitly presumes that supplying increased exposure (Berto, 2005; van den Berg *et al.*, 2007; James *et al.*, 2015) or access to goods, such as green spaces (van den Berg *et al.*, 2010; Beyer *et al.*, 2014), provides a fitting approach to planning for health and well-being. Although such work has greatly enhanced our comprehension of what needs to be considered in planning (Han, 2010), this line of research is often more attribute descriptive than conceptually informative (Lennon *et al.*, 2017).

Gibson's (1979) "ecological approach" to perception offers a potential corrective to this deficiency. Although having gained some currency with those researching children's use of space (Heft, 1988; Jongeneel *et al.*, 2015; Prieske *et al.*, 2015), and how adolescents interact with green space (Clark and Uzzell, 2006; Townshend and Roberts, 2013), work inspired by Gibson's research is limited regarding adult perceptions of green outdoor environments (Nordh and Østby, 2013), and is comparably unexplored in the context of planning for health and well-being. Central to Gibson's approach is the idea that perception is an embodied, socially positioned and dynamic experience. From this locus, organisms perceive a world of potentialities identified relative to their social, psychological and biophysical capabilities. Such user-specific potentialities are the relative "affordances" offered to somebody by something, such as a riverside path ("walkability"), outdoor gym equipment ("usability") or community garden ("communability" with others). In applying the language of the CA, it is possible to conceive this world of potentialities as being profiled by the interactivity of "conversion factors" as they mould a person- or group-centred sense of capabilities. Hence, in keeping with the CA, it is important to acknowledge the diversity of personal, social and environmental conversion factors that advance or hinder the realisation of needs and desires

held by a diversity of people in relating to their world (Douglas *et al.*, 2017; Withagen *et al.*, 2017). Thus, to plan for health and well-being without contextual sensitivity to how a diversity of people relate to their experiences of place risks curtailing the potential health and well-being benefits of such interventions (Bell *et al.*, 2014). Hence, through integrating the conceptually attentive attribute orientation of affordances theory with the sensitivity to diversity advanced in the conceptual structure of the CA, it is possible to construct an analytical framework that responds to contextual variances in people's needs and desires that align attributes with aspirations in expanding the range of affordances that people enjoy with respect to their local environment (e.g. jogging, resting, birdwatching, meeting friends). In doing so, such an approach enhances the "well-being freedoms" that people have with respect to the use of their locality. Key to this is a recalibration of how interventions are formulated and targeted so as to respond to the particularities of those personal, social and environmental conversion factors evidenced within communities and the environments in which they are located. In essence, this involves retuning planning for health and well-being so that it becomes an endeavour to address conversion factors in order to create "bridging points" that connect intervention attributes with affordances in responding to desired functionings and increasing the capabilities that people have to

both explore and enjoy the health and well-being opportunities offered by their environment (Figure 7.2).

Hence, what follows is the outline of a means to determine where and how to create these "bridging points". This approach is inspired by research that seeks to explore the connection between attributes and affordances (Nordh *et al.*, 2009; Hartig *et al.*, 2011; Withagen *et al.*, 2012; Nordh and Østby, 2013; Zipoli Caiani, 2014; Hadavi *et al.*, 2015; Aradi *et al.*, 2016; Davids *et al.*, 2016). Specifically, it draws upon the large and growing body of research employing photographs as a means of investigating people's preferences (Hartig and Staats, 2006; Barroso *et al.*, 2012; van der Jagt *et al.*, 2014; Almeida *et al.*, 2016). Although this work varies in the type of environment examined, from waterscapes (Bulut and Yilmaz, 2009) and forest environments (Gundersen and Frivold, 2008) to private gardens (Harris *et al.*, 2018) and urban recreational environments (Polat and Akay, 2015), research in this area generally seeks to quantify preferences as a means to inform decision-makers (Hadavi *et al.*, 2015). However, by integrating an affordances perspective with the CA, the method described below moves beyond conventional studies that associate physical attributes with perceived affordances in a specific space and at a specific time towards an image-prompted qualitative understanding of "why" certain potential interventions are preferred.

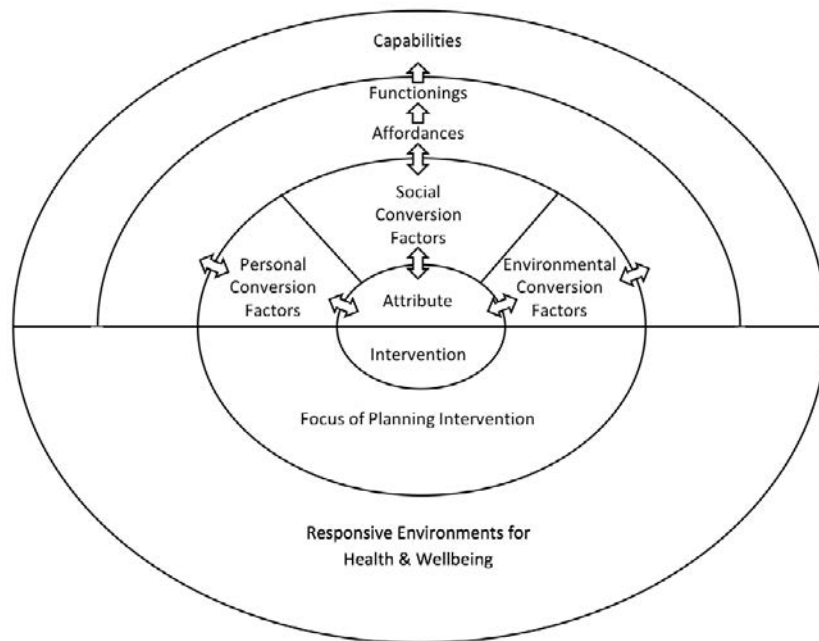


Figure 7.2. Diagrammatic representation of the relationship between the conceptual and applied dimensions of the integrated CA-affordances theory framework.

In doing so, it endeavours to complement rather than replace the work of others. It seeks to achieve this by furnishing a conceptual advancement that provides a means for planning to identify interventions that are responsive to the particular needs, aspirations and characteristics of people, as elicited via an image-stimulated “self-reflective narrative” of their “broader” relationship with a particular place.

7.4 Determining Desires: Outline of a Method

The community engagement method developed to elicit and study people’s perceptions of the interventions seen as necessary to enhance the health and well-being opportunities of their environments focuses on the local spaces that people use or seek to use on a regular basis. As such, this method seeks to connect people with places, and thereby furnish context sensitivity in the information garnered. Following the compilation of a photo set, the consultation method is sequentially deployed in a two-step process, namely (1) sorting and (2) spatialisation. The entire process takes place at a “station”, comprising two chairs, one for the participant and one for the researcher, and two tables, one for the sorting exercise and one for the spatialisation exercise. Photographs are taken following the completion of each of the exercises to visually record the choices made by participants. An audio recording device is used to facilitate later review of the narratives given by participants and can be left recording for the duration of the process.¹⁴ The purpose of the consultation method is explained to participants before they commence the exercises.¹⁵ Although there are advantages around group-based exercises, such as their potential for consensus building or as social learning (Lennon *et al.*, 2016), this method is focused on individual respondents. This is to enable the research to capture individual experiences and map the contours of individual agency in terms of conversion factors, thereby helping planners and designers identify multiple pathways to enhancing well-being through green space design that emphasises sensitivity to the multidimensionality of context.

7.4.1 Photo set compilation

Drawing on information from a residential survey of 532 respondents of mixed genders, ages and ethnic backgrounds, spread across two rural towns, two suburban environments and a dense urban area with differing socio-economic characteristics, a series of desired generic interventions for enhancing the health and well-being potential of local environments was determined. These varied from the installation of outdoor gym equipment and the supply of more pedestrian crossings to the provision of more natural outdoor play spaces and calls for the improved maintenance of green spaces. Such suggestions formed the basis for the compilation of a series of photographs illustrating those desired interventions that were most frequently recorded in the survey. This selection was then supplemented with photographs illustrating the attributes indicated in the academic literature as most salient in determining the perception and use of spaces from a health and well-being perspective. To avoid possible effects of familiarity on the information elicited from participants, photographs were sourced from the internet (Hadavi *et al.*, 2015). A large selection of images was initially assembled. This was progressively reduced to 20 photographs over two rounds of team discussions. It was deemed necessary to do this to avoid duplication and prevent participant confusion when it was possible to identify multiple potential interventions on an image (e.g. playing pitches and cycleways). The decision to reduce the photo set to 20 images was based on a desire to balance an adequate array of characteristics and attributes with a desire not to overwhelm participants (Bullock, 2006), as well as to facilitate efficiency in the sorting exercise (see the following section).

7.4.2 Sorting

This exercise involves three tasks that are completed in sequence by a participant seated at a table. The first task involves the participant reviewing the entire photo set, all 20 images of which are randomly arranged and fully visible. The participant is informed that each of the photographs represents a particular characteristic or facility that one might expect or hope

¹⁴ A camera-enabled smartphone with a recording app may be used.

¹⁵ Consent is sought and some basic information is logged regarding age, gender and whether the person lives locally or is a visitor. In the case of whether the person lives locally or is a visitor, the frequency of visits to the area per week is recorded.

to find in a pleasant environment. The participant is then asked to select 15 photographs that represent the characteristics or facilities that in their opinion would entice them to use the spaces in which they can be found. Hence, the participant removes five photographs that represent those attributes that they find least enticing (or potentially those that they consider to be duplicated in other photographs). Once the 15 photographs have been selected, the exercise moves onto the second task. Here, the researcher asks the participant to imagine that they are thinking about how to improve the areas in and around their locality from a health and well-being perspective. They are requested to create three options for improving these areas from the 15 photographs that they have selected in the first task. These options are referred to as options A, B and C. Participants are informed that option A should include those characteristics or facilities that they find most attractive from a health and well-being perspective, with the photographs that they like second best included as option B and the photographs that they like the least included as option C. Following completion of this process, the third task commences. In this instance, the researcher asks the participant to rank the photographs from top to bottom with respect to the characteristics or facilities shown in the photographs in terms of what would entice them most to use a local space. Thus, the sequentially ordered three tasks of this sorting exercise are designed to progressively require the participant to (1) narrow the range of characteristics and facilities that would entice them to use a local space and (2) rank these in order of priority. This sorting process thereby helps distil perceptions on those specific attributes of a locality that are considered most important to a particular user.

However, to fully understand the relationships between existing and potential attributes, conversion factors and the present or possible affordances presented by current or conceivable planning interventions, it is important that the participant is asked to explain (1) what each of the photographs means to them; (2) the reasons for not selecting the five photographs in the first task; (3) the reasons for placing the remaining 15 photographs in each of the option columns; and (4) the reasons for the order of ranking of the photographs within each of the columns. In essence, this section of the sorting exercise acts as a semi-structured interview based around the

photographs arranged by the participant. Particular attention is given to eliciting from the participant information regarding “what” the specific attributes shown in the photographs that they like the most are and “why” this is the case. Thus, connections are specified between attributes and affordances with respect to desired functionings. Probing into the reasons for arranging the photographs into each of the options is conducted to appreciate how the participant perceives the interactivity between the different attributes, affordances and functionings identified. The participant is also questioned on the reasons for not selecting the five photographs in the first task, to appreciate “what” is considered less desirable, or if something is considered undesirable and “why”. Either throughout this interview process or in a subsequent review of the audio recording, the researcher notes the perceived associations mentioned by the participant between “what” is shown in the photographs under discussion (attributes), the reasons “why” these attributes are valued (desired functionings), “how” the attributes facilitate the desired doings or beings (affordances) and any personal, social and/or physical issues (conversion factors) that they believe currently do realise, or would potentially help or hinder realising, the functionings interpreted from the photo. This provides the basis for an understanding of where planning interventions can be made in response to how people use or would like to use their local environment. Once this interview process is completed for all of the photographs, the process moves to the spatialisation exercise.

7.4.3 Spatialisation

In this exercise, which involves linking the “abstract” to the “applied”, participants are directed towards an A1-sized aerial photograph of their locality. The researcher assists in orientating the participant’s reading of the photograph by noting their current location relative to a number of local landmarks, such as supermarkets, churches and parks, which are labelled on the aerial photo. This exercise consists of two tasks. The first task involves shifting the attention of the participant from the generic to the specific. Accordingly, from the 15 photographs selected and arranged into options in the sorting exercise (see the previous section), the participant is asked to select three photographs that represent the health and well-being characteristics or facilities that they think would

entice them to more frequently use the areas shown on the aerial photograph if introduced to the locality or if enhanced, in the case of characteristics or facilities that are already present. The participant is then requested to indicate on the aerial photograph where they think the facilities or characteristics represented in the three selected photographs would make the greatest impact in improving the appeal of an area as a place to spend time for leisure or recreation.¹⁶ This process thereby requires the participant to (1) further distil their views on what attributes are most favoured and (2) specify the locations in the locality where they believe the interventions that best provide opportunities for the realisation of the attribute-associated functionings should be situated. In this sense, the spatialisation of such valued affordances supplies guidance to planners seeking knowledge on how best to target interventions for a tailored response to the aspirations of those using or wishing to enhance their use of local spaces. Once the participant has placed the three selected photographs on the aerial photo, the researcher questions the participant on “what” are the attributes they value in these photographs, in the context of “what” are the desired doings or beings (functionings) that these photographs represent, “how” the attributes identified in the photographs “afford” these functionings, and “why” these are valued. The reasons “why” the participant recommends introducing the specified attributes at particular positions in the locality are probed, with particular attention paid to determining what personal, social or physical issues (conversion factors) the participant believes would help or hinder the impact of such interventions.

In the second task, the participant is supplied with two sets of icons. The first set of icons shows a person walking. The researcher explains to the participant that this set of icons can represent a new or enhanced walkway, for example through the provision of linkages, streetlights or better surfaces. The second set of icons shows a person on a bike. Similarly, the researcher explains to the participant that this set of icons can represent a new or enhanced cycleway. The participant is then asked to place these icons on the aerial photograph where they think interventions could be made that would have the greatest impact in terms of enticing the participant to engage more

frequently in walking and cycling in the locality. The participant is invited to arrange the icons on the aerial photograph to indicate suggested routes for the walkways and cycleways, or to simply use the icons to indicate the approximate position of existing walkways and cycleways to be enhanced (Figure 7.3). The researcher then questions the participant with respect to how the different icons have been placed. Probing of answers is used to ensure a full appreciation of “what” enhancements are desirable “where” and “why”, as well as “what” types of new routes are seen as desirable “where” and “why”. Particular attention is given to probing issues of concern regarding personal, social and physical matters (conversion factors) perceived as helping or hindering active mobility in the locality.

As with the sorting exercise, the information from both tasks is carefully noted either during the process or subsequent to the exercises using recordings. Such information thereby supplies a basis for a more holistic understanding of “what” types of interventions to target “where” and “why” in creating health and well-being enhancements in a local environment that respond to the particularities of those resident in or visiting the area. The next section illustrates the benefits of deploying this method in garnering a nuanced appreciation of people’s aspirations for use of their local environments.

7.5 Contextual Sensitivity: Applying the Method

To explore the value of this method in acquiring contextually sensitive information for planning health and well-being enhancements, it was utilised in a range of different local environments, namely in a rural town, a suburban residential neighbourhood and a dense town centre area. In total, 53 people participated in the process, comprising a mix of ages, genders, ethnicities and socio-economic backgrounds. Working through the sorting and spatialisation processes with each participant took approximately 30 minutes. This time was necessary to facilitate effective image-prompted probing of the personal, social and physical/environmental reasons (conversion factors) given by participants for favouring certain interventions.

16 Blu Tack was used to attach each of the photographs to the position on the aerial photograph proposed for the intervention.



Figure 7.3. Photograph of the spatialisation exercise.

7.5.1 Rural: Banagher

Banagher is rural town of approximately 1760 people located in County Offaly in Ireland's Midlands (CSO, 2016). The area surrounding the town is characterised by fertile agricultural lands and family farmsteads of cereals and dairy. The economy of the town is closely linked to its agricultural hinterland and a sizable cement factory immediately west of the town centre. Located at the northern extent of the town is the expansive River Shannon, an associated harbour area and a series of large seasonal wetlands. The town effectively comprises two main streets on which are situated a number of shops and a pub. These streets converge at a central square, which is largely occupied by car parking areas. The "activity hub" of the town is a small mall occupied by a supermarket, takeaway and three small shops. Given issues of footfall in the town consequent on its size, and the need for

shelter to ensure that participants were protected from inclement weather when working through the sorting and selection processes, it was decided to deploy the method in the small mall. This was undertaken between 1500 and 1900 on a Thursday in March 2018, to align with times when traffic could be expected within the mall's single pedestrian retail arcade.¹⁷ Three stations were erected and a researcher was positioned at each.

Those participating in the process were generally positive about the town. All remarked on Banagher's strong sense of community and the availability of opportunities for walking, jogging and communing with nature. However, deficits were identified. In particular, the sorting exercise elicited a common narrative regarding the underutilisation of existing green spaces, as participants were asked to explain the reasons why they did not select photographs showing

¹⁷ Thursday afternoon and early evening is a popular grocery shopping time as people prepare for the approaching weekend.

different types of parks. As succinctly explained by one participant, “there’s loads of green space as it is, either in the town or on the edge of town” (participant BB3). Hence, concern centred not on the supply of green space, but rather on its use. In this sense, specific attention was given by participants in both the narrative explanation prompted by the sorting exercise and the subsequent spatialisation exercise to the role of the River Shannon. As concisely summarised by one participant, “I think the Shannon is our biggest asset and we need to use it more” (participant BA6). In this context, during the spatialisation exercise, almost all participants sought to enhance the riverbank area in some way, including suggestions for the provision of sheltered outdoor seating, a café kiosk and outdoor gym equipment “by the river where we walk and do everything” (participant BA4). Issues surrounding the utilisation of the riverbank area were associated by most participants with concerns regarding the underdeveloped walking and cycling network, facilitating access to numerous attractions in the area. Hence, the concerns expressed were not primarily about the availability of amenities to attract people to engage in outdoor activities; instead, a recurring pattern of concern emerged regarding the ability to access existing amenities (including a disused railway line informally used for recreational walking) and, latterly, the enhancement of these. As such, all participants focused on enhancing access to existing locally identified amenities during the spatialisation exercise. For example, during the spatialisation exercise, one participant explained why he proposed creating stronger walking links between the town centre and the River Shannon, as follows:

That track down there, is down to what’s called Tower Callow. So this is one of the Shannon Callows [seasonal riparian wetlands]. So that’s wildflower meadows in summer; flooded in winter. Full of birds, full of wildflowers; incredibly important habitat in a European context. And there is a path for one kilometre down it already ... so, what I’m talking about is [providing] access from the town ... That’s what I’m talking about: linking into the outdoor space and the important wildlife and habitats (participant BB3).

Indeed, concerns regarding accessibility to amenities, rather than proximity or provision, emerged as a broader issue with respect to rural living during

questioning around the reasons for the prioritisation of particular photographs and the specification of certain enhancements on the aerial photo. Here, concern was expressed by several participants regarding the car dependency of rural life. As conveyed by one interviewee:

I feel when I lived in really urban places, walkability is a lot easier because you’re able to walk places and you’re inclined to walk places. Like I was living in Birmingham a few years ago, and I was probably two or three miles from the city centre, and I walked so much; I walked everywhere. But here you have to use a car to get anywhere, to do anything. So, you tend to just use your car to go places ... So, in one way a town is walkable, and in another way, because it’s a rural town, it’s not so much (participant BB5).

Accordingly, the reflective narratives elicited from all participants during the sorting and spatialisation exercises referenced and proposed solutions for the deficit of segregated walkways and roadside footpaths leading to amenities in the area, which are seen to support health and well-being, such as the disused railway line. In some instances, this involved creating connections to form looped walks, linking a series of natural and cultural heritage attractions. In others, it entailed extending the pavement to provide safe access to an already frequented destination (e.g. the town cemetery). Interestingly, no participants proposed cycleways within the town centre, as the road here was generally perceived to be too narrow to accommodate such an intervention. Instead, almost all participants sought to utilise cycleways as a means to connect the town to attractions in the broader rural hinterland and to other towns in the region.

Therefore, what the deployment of this method in Banagher suggests is that interventions focused on “providing more” facilities would be misguided. This is based on local evaluations of the existence of these facilities, yet problems in accessing them. In essence, the narratives elicited through this method point to a broader issue of local mobility, rather than provision of facilities. Consequently, standard planning interventions to enhance health and well-being, such as the installation of robust outdoor gym equipment, would be likely to have a minimal impact in the absence of initiatives targeted at first improving

access and active mobility in the area. In this context, the conversion factors required for the realisation of those functionings desired by the local community are primarily environmental, as personal conversion factors, such as gender-related vulnerability,¹⁸ and social conversion factors, such as management regimes, were rarely mentioned by participants. Hence, this research suggests that unlocking the potential affordances offered by amenities in the local area to improve the well-being freedom of residents to choose activities that reflect their interests involves a targeted series of interventions that affords greater access and circulation from the town to contiguous cultural and heritage amenities. Only once this is completed should efforts at enhancing the provision of health and well-being facilities, such as outdoor gym equipment and outdoor sporting spaces, be undertaken.

7.5.2 Suburban: Ballybeg and Kilbarry

The contiguous suburban areas of Ballybeg and Kilbarry are situated south-west of the centre of Waterford city and are closely associated in terms of land use, history, social ties, demographics (age and ethnicity) and socio-economic characteristics. Approximately 3997 people live in this suburban area (CSO, 2016). The residents of the area have a relatively low level of educational achievement compared with other suburban areas in the city and a high proportion of the local population are employed in occupations classed within the lower socio-economic categories used by the Irish CSO.¹⁹ Ballybeg–Kilbarry is characterised by extensive areas of accessible green space provision, although the quality of such spaces is poor, with vandalism a recurrent problem in the area. Vehicular movement in the area is facilitated by a number of wide roads, almost all of which include a generously proportioned footpath. A small convenience store services the area. Adjacent to this is the façade of a pub that was destroyed in a fire in April 2011. A community centre café and fenced community garden located nearby currently serves as the “activity hub” for the community. Consequent on

issues of low footfall in the public realm, and the need for shelter to ensure that participants were protected from intemperate conditions when progressing through the sorting and selection exercises, it was decided to deploy the consultation method in the community café. Advance notice of the presence of the consultation event was provided to residents by way of a leaflet drop. The consultation process was undertaken between 1000 and 1430 on a Thursday in November, prior to the busy Christmas shopping season, when it would be less likely that residents would be spending time in the community café. Three stations were erected and a researcher was positioned at each.

Those who participated in the consultation process expressed a strong attachment to the area but were nevertheless concerned about a number of issues that they believed impeded the health and well-being potential of the environment. Of particular note were issues surrounding “gatherings”, in the sense of both problems associated with anti-social behaviour and the lack of places for the community to socially interact since the destruction of the local pub in 2011. As relayed by one interviewee when explaining the reasons for not favouring photographs showing woodlands, park benches and children playing on a log, “Don’t get me wrong, I’d love it. But I’d be concerned about anti-social behaviour or gatherings” (participant KB2), with another explaining that a photograph of roadside planting was not selected because “the problem with things we have around here is that we’re putting up things and they’re getting destroyed” (participant KA3). This issue was echoed by many participants, with one succinctly conveying the concern when reflecting on previous well-intentioned planning interventions:

Over the last 10 or 20 years we’ve had lots of people coming out with lots of ideas for the community, and one of the council’s [local planning authority] ideas several years ago would have been to plant a big wood nearby. In theory this sounded very good; in practice, then, we didn’t feel it was the best thing from a community safety point of view. We didn’t

18 When mention was made of vulnerability, this was confined to a small number of elderly participants, who felt vulnerable in areas where young people may be present in groups.

19 The entire population is classified into seven social class groups, ranked on the basis of occupation. The occupation classifications used in the census are based on the UK Standard Occupational Classification system, with modifications to reflect Irish labour market conditions.

feel that having an isolated, covered-in area in the community would be the safest for residents (participant KB4).

Against this backdrop, all participants felt that providing greater opportunities for people within the area to socially interact in a safe communal setting was a key requirement to enhance the health and well-being-supporting qualities of the local environment. It is in this sense that images showing people gathering for passive leisure or active recreation emerged as a recurring pattern across participants' arrangement of photographs in option A during the sorting exercise. As concisely relayed by one participant, "A lot of my ones in number A have people in them, social spaces" (participant KC1). This desire for the provision and arrangement of interventions that afford opportunities for socialisation was a salient theme throughout the consultation process. Hence, most participants explained the choice and ranking of photographs in option A as being focused on "community-based activities ... anything that gets people together outside" (participant KA3). The reasons "why" this was deemed so important for the residents of the area was articulated by one participant who explained that:

All of the ones in [option] A are about community and meeting together ... there's not really a lot of places around here that are open to the public, for people to go and congregate, and just meet up and have a chat and a laugh ... where people can meet, otherwise the community is going to fall apart (participant KB3).

Reflecting this, a clear trend was identifiable during the spatialisation exercise, in which participants selected three photographs that they felt would synergistically operate in responding to residents' desires for greater community interaction if co-located. As rationalised by one participant when explaining their decision, "I would like these centralised to consolidate [uses]" (participant KA3). A similar desire for the centralisation of interventions "so people can meet and gather" (participant KC3) and enjoy "intergenerational opportunities to mix" (participant KA2) was reflected in the positioning of walkway and cycleway icons on the aerial photograph where participants sought to use such interventions as a means to "blur boundaries and help integrate communities" (participant KB4), by

providing connectivity both within and beyond the area (Figure 7.4). Interestingly, and in contrast to the case of Banagher, broader issues of mobility did not appear as a matter of significant concern, with the exception of a common desire for more pedestrian crossings in the areas surrounding the recommended co-located interventions for enhancing community socialisation.

Thus, what the deployment of this method in Ballybeg–Kilbarry suggests is that interventions focused solely on providing greater access to nearby green space would be misguided. Likewise, focusing on the supply of standard interventions, such as outdoor gym equipment or new walking tracks, in the absence of contextual sensitivity to the desires of the community regarding "what" should be located "where" and "why" would probably have little effect, and may even result in negative impacts, as poorly planned interventions become sites of anti-social behaviour that further deter residents from actively engaging with their outdoor environment. Hence, what is required is attention to the geography of the relationship between the forms of interventions, their location and the sense of vulnerability to anti-social activity felt by residents of the area. It is in this context that the conversion factors requiring attention for the realisation of the desired functioning expressed by participants – enhanced social interaction – are threefold and closely related: personal (sense of vulnerability), social (issues of anti-social behaviour) and environmental (the co-location of desired amenities). Efforts should therefore be co-ordinated with social services and local youth workers to help inform the types of interventions that can address the constraining social conversion factors inhibiting the use of public spaces. In conjunction with interventions targeting environmental conversion factors – such as the co-location of an often-mentioned café, bowling green and playground in an accessible area – these would help address personal conversion factors centred on a sense of vulnerability, by supplying spaces of active socialisation and positive intergenerational contact that are "not out of the way", but rather that are "good for passive surveillance" (participant KC5).

7.5.3 *Urban: Tallaght town centre*

Tallaght town centre is located to the south-west of Dublin city centre and is characterised by a dense residential environment of apartment blocks, offices



Figure 7.4. Ballybeg “spatialisation” exercise example.

buildings, a hospital, one of Ireland’s largest shopping malls, a theatre and a number of hotels. A significant volume of space in the area is allocated to multi-storey and surface car parking. The area is also well serviced by bus routes and a light rail transit system. Approximately 5733 people live in Tallaght town centre, with a diversity of socio-demographic characteristics (age, ethnicity, social class) evident (CSO, 2016). There are a number of well-maintained parks located in proximity to the area. Similar to the consultations in Banagher and Ballbeg–Kilbarry described above, because of the need to ensure that participants were protected from the weather, it was decided to deploy the consultation method in a community café situated in the middle of the town centre area. Advance notice of the presence of the consultation event was supplied to residents by way of a leaflet drop. The consultation process was undertaken between 1200 and 1930 on a Tuesday in November. Four stations were erected and a researcher was positioned at each.

In general, participants enjoyed Tallaght town centre and the range of amenities it offered. However, particular concern was expressed that the area does not currently afford many opportunities to comfortably relax, “especially in public spaces; if the kids are outdoors, you can’t watch them” (participant TB4). Hence, in the sorting exercise, a pattern emerged of participants ordering the photographs to reflect a desire for public realm improvements that would enhance the attractiveness of the town centre area as a space to leisurely spend time. As articulated by one participant in explaining the reasoning behind the ranking of photographs in option A, “The first three cards [photographs] are connected; it’s about being outside relaxing with friends and family” (participant TA3). In this context, many participants expressed a desire for a more pedestrian-friendly public realm. This view was conveyed by one participant when clarifying the reason he had decided to not select a number of photographs in the sorting exercise:

I've excluded a number of road-based photographs because if you want to have a proper urban centre you need to have a pedestrian area and they [the photographs] represent through traffic. Whereas I think we should be avoiding it as much as possible (participant TC2).

Hence, in suggesting where a select number of interventions could have the greatest impact on enhancing health and well-being in the local environment, many participants justified their focus on "greening" the car-dominated public realm on the basis of "we do miss seating; so that's the first thing" (participant TA5). Particularly favoured was a configuration of uses that combined an outdoor café and seating area for parents in proximity to a safe and visible children's play space. As outlined by one participant with reference to the ordering of photographs in option A:

It's [outdoor café and seating] probably needed to be under a shelter like this [referencing a photo] ... so you can have your coffee while your kids are playing, if it's not raining and you're a little bit sheltered (participant TB1).

Thematically similar, but with a geographical focus on parks in the area, was a related desire to facilitate spaces for passive relaxation. Here, many participants expressed the view during the spatialisation exercise that a café kiosk with associated outdoor seating would address a deficit of outdoor relaxation opportunities and create an attractive destination that would draw people into such green spaces. As succinctly conveyed by one participant:

I think this [referencing photo of an outdoor café kiosk and seating] is the most important out of everything because it's inclusive. Everybody can come here, and people will love places like this, to relax in the open air instead of going inside a mall (participant TA3).

Thus, a recurring pattern during the spatialisation exercise was a suggestion to co-locate and integrate an outdoor café with seating in creating spaces that

simultaneously afford opportunities for parents to relax and children to play. As relayed by one participant when explaining the logic of the three photographs chosen and placed on the aerial photo:

I think they could all be integrated. Some of them are already there, but I think if you're going to have a cluster of coffee shops, make the area around it more accessible. Stuff that kids play with isn't necessarily kids' stuff ... you could have an urban garden going around the shopping centre or going around the area and having little walking trails interspersed with it (participant TC2).

Also conveyed in this explanation is a perception held by the majority of participants that simple looped walkways and cycleways connecting destinations such as the hospital and shopping centre would suffice, as much of the desired walking and cycling infrastructure is already in place.

Therefore, what the deployment of this method in Tallaght town centre suggests is that interventions focused on the supply of goods, such as new walking tracks or sports facilities, may have high financial costs and marginal impact, especially given the accessibility of the area by a variety of transport modes, as well as the availability of organised sporting clubs and indoor gymnasias within close proximity. Furthermore, it was noted that personal conversion factors, such as gender or age-related vulnerability, and social conversion factors, such as anti-social behaviour or public space management regimes, were not mentioned by participants. In this context, the conversion factors to be targeted in helping residents to realise their desired functionings are primarily environmental. Hence, this research indicates that enhancing the health and well-being quality of the local environment in response to the desired functionings of those participating in the consultation exercise involves simple interventions that afford opportunities for relaxation while passively monitoring one's children at play. Although such interventions seem to support only sedentary activities among adult cohorts, their introduction would result in the creation of destinations that entice residents to walk outdoors and relax in spaces that afford opportunities for social engagement, thereby supporting physical health and socio-psychological well-being.

7.6 Conclusion

The literature generally endorses the view that green spaces, as part of the wider environmental context, promote health and well-being (Maas *et al.*, 2006; WHO, 2016) and provide health services as part of a wider array of ecosystems services (Jackson *et al.*, 2013; Lennon and Scott, 2014). These health services are understood to range from direct positive effects on mental and physical health, to improved well-being resulting from physical activity and social engagement in green space (Sandifer *et al.*, 2015). As a result, access to green space is increasingly framed as an environmental justice issue (Walker, 2012; Nesbitt *et al.*, 2018), focusing on the equitable distribution of green space. For example, in a major review of the Anglo-American literature, Wolch *et al.* (2014) outline that most studies reveal that the distribution of such space often disproportionately benefits predominantly white and more affluent communities. Moreover, green space interventions have been increasingly critiqued in relation to the potential for green space-led gentrification through their impact on property values and thus displacement of lower income groups (Curran and Hamilton, 2012; Scott *et al.*, 2016).

Although recognising the importance of access and equity, we seek to contribute further to these debates by complementing a concern over spatial distribution with greater attention given to the quality of the green spaces provided. However, undermining the effective provision of green space for health and well-being are difficulties in formulating broadly applicable concepts of what constitutes “quality”. In other words, the existence of green space in a locality does not always equate with a health-promoting environment. For example, within an urban context, perceptions of vandalism, safety concerns and poor design may undermine the use of green space (Walker, 2012). As such, it is clear that the “quality” of green spaces is at least as important as “quantity” and “proximity” in promoting physical activity.

This chapter has sought to respond to this oft-neglected position of “quality” in planning for health and well-being by providing an outline introduction to the CA and affordances theory, with a view to demonstrating how integrating these perspectives provides a conceptual advancement that pushes planning research beyond generic correlations between “what” affordances are perceived by “whom” at a particular space and time. Specifically, this

chapter has sought to supply a means for planners to determine “what” affordances are perceived by “whom”, “where”, “when” and “why”. As demonstrated through a series of exploratory case studies, this is achieved via a photo-elicitation method that prompts an informative narrative on “why” certain interventions are favoured over others. The narrative of reasons provided in this process thus supplies the “thick description” necessary to appreciate what affordances are sought, rather than the attribute-specific details of what affordances are provided by objects already in place. As such, it allows planners to plan in a responsive manner. At the core of this is attention to the ways in which conversion factors mediate between the attributes of an object or space and the affordances that such an object or space is perceived to offer. Indeed, through attending to conversion factors, this chapter argues that planning is better positioned to respond to issues of “why” certain functionings are considered as more important by the users or potential users of particular spaces, and “how” they can be met through interventions that expand the well-being freedoms of those users of the spaces that are planned.

This is undertaken as a corrective to problems associated with a “means”-focused approach to planning, which is predominantly concerned with ensuring equitable access of opportunities through the allocation of access to “goods”. Specifically, the integrated CA–affordances approach presented above seeks to address how a focus on the supply of “means” may inadvertently impede the impact of “goods” allocation by failing to appreciate the “ends” sought by those to whom the provision of such “goods” is directed. Accordingly, the framework advanced in this chapter seeks to complement rather than replace well-intentioned Rawlsian-inspired efforts at enhancing the health and well-being qualities of residential environments. In this sense, planning for health and well-being entails applying a Rawlsian-inspired focus on the equitable distribution of opportunity through the fair distribution of “goods” at the scales of countries, counties and cities, complemented by a Senian-inspired focus on augmenting “well-being freedom” at the local level through a focus on facilitating the desired “ends” to which the recipients of “goods” seek to use them in realising to enhance health and wellbeing. Hence, although largely an exploratory endeavour to formulate a way for the planning of

responsive environments, the method outlined in this chapter suggests that, for planners looking to enhance health and well-being, greater attention needs to be

given to formulating ways that both determine and respond to the diversity and contextual particularities of real people as they relate to actual places.

8 Conclusion and Recommendations

8.1 Introduction

This final chapter aims to synthesise the key findings of the Eco-Health project and also to develop a series of recommendations to advance green space as a health-promoting environment. It is the intention in this chapter not to provide a prescriptive set of rules for implementing green space strategies, but rather to offer a suite of research-based principles to inform policymaking and design, to explore alternative policy instruments and to identify areas of further research. The various recommendations are considered under six headings:

1. Green spaces as a public health investment.
2. Institutional and governance arrangements.
3. Enhancing green space within local authority statutory planning.
4. Designing green spaces for health.
5. Co-design of green spaces to maximise health benefits.
6. Capacity building requirements.

8.2 Key research findings

As discussed in Chapters 1 and 2, the link between environmental conditions and human health is now well established, with the environment viewed as one of the key determinants of health alongside inherited characteristics, lifestyle and social and economic variables (Barton, 2009). Within this context, the design of the built and natural environment can potentially provide key pathways to creating healthier people and places, particularly in relation to enhancing opportunities for physical activity within the design of the built environment, creating environments that reduce stress and expose people to the restorative benefits of nature, and enhancing liveability. This requires a paradigm shift away from dominant models of car-based development and urban sprawl, in which urbanisation and the associated increasing rise of obesogenic environments are creating health and well-being challenges. Instead, the design of the

built environment should create more people-centred places that are more compact and of mixed use, with enhanced opportunities for cycling and walking.

This report has focused on the positive role that green space can play in enhancing liveability and providing health-promoting environments in both urban and rural localities. Green spaces and green infrastructure are increasingly viewed as providing locations for “restorative” contact with nature, physical activity and social engagement, which evidence suggests positively influences well-being and triggers behavioural change towards a healthier lifestyle. The key benefits derived from green spaces and green infrastructure approaches are summarised in Box 8.1 (and discussed in detail in Chapters 1 and 2).

Chapter 3 of this report outlined that these benefits have been increasingly recognised in policy at international and national levels. From a health perspective, public health policy has increasingly shifted from a health services focus and treating ill health towards a “whole systems approach” to health and well-being. This approach recognises that positive health outcomes not only are determined by inherited individual characteristics, but also are influenced by contextual factors including the social and environmental determinants of health, which in turn can reinforce health inequalities. Within this context, Ireland’s framework for health and well-being – Healthy Ireland (2013) – emphasises a HiAP approach, recognising that health outcomes are influenced by a range of government departments and policies, including environmental and planning policy. Therefore, for local authorities and public agencies involved in green space provision, enhancing the health-promoting qualities of green spaces and green infrastructure can provide an important pathway to addressing the goals and targets of Healthy Ireland.

From the perspective of sustainable development, urban policy and spatial planning, the concept of healthy places is increasingly espoused internationally and nationally, and key policy documents now support integrating health concerns into how we plan and manage human settlements. Moreover, these policy frameworks explicitly recognise the potential

Box 8.1. Key benefits of green spaces

- Promote physical activity: through creating spaces for play, recreation, walking and cycling within a safe environment.
- Enhance mental well-being: through creating urban refuges (from busy streets, traffic, noise) and providing a restorative environment through increased contact with nature.
- Enhance social interaction: through providing opportunities for local people for social contact, and community-building activities in the public sphere.
- Reduce environmental risks from pollution: by mitigating air pollution and noise pollution through urban greening.
- Mitigate environmental risks from extreme weather: through countering the urban heat island effect and acting as a “sponge” within the context of extreme rainfall or surface flooding. Both warmer and wetter weather are anticipated as likely climate change impacts in Ireland, thus green spaces can future proof Irish urban areas against further risks.

of enhancing green spaces for liveability and wider well-being outcomes. Therefore, by enhancing the provision and design of green spaces, local authorities and public agencies can contribute towards implementing the following policy commitments.

First is the UN SDGs, specifically implementing SDG 11: Sustainable cities and communities, and targets relating to increasing green space access, to enhance the liveability and sustainability of the places where we live. At a national level, the National Implementation Plan for SDGs aims to mainstream SDGs into Irish policymaking.

Habitat III, the UN’s New Urban Agenda, identifies the improvement of human health and well-being as a key priority urban goal. This document specifically highlights the importance of the creation and maintenance of well-connected and well-distributed networks of green spaces to improve physical and mental health, social inclusion and social interactions, urban liveability and resilience to environmental risks.

Promoting green space as a health-promoting environment through a green infrastructure approach is aligned with key objectives within the NPF, particularly relating to “healthy communities” (see NPF section 6.2) and environment and sustainability objectives (see NPF Chapter 9), including:

- *National Policy Objective 26.* Support the objectives of public health policy, including the National Physical Activity Plan, through integrating such policies, where appropriate and at the applicable scale, with planning policy.

- *National Policy Objective 27.* Ensure the integration of safe and convenient alternatives to the car into the design of our communities, by prioritising walking and cycling accessibility to both existing and proposed developments, and integrating physical activity facilities for all ages.
- *National Policy Objective 58.* Integrated planning for green infrastructure and ecosystem services will be incorporated into the preparation of statutory land use plans. Green infrastructure planning will inform the preparation of regional and metropolitan strategies and city and county development plans by ensuring that sufficient and well-planned green spaces, commensurate in scale to long-term development requirements, are designated in statutory plans.
- In addition, green infrastructure and green space provision should be viewed as complementary to the NPF’s framework on delivering higher density, more compact urban settlements.

In the *Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (Cities, Towns and Villages)*, enhancing green space and the green public realm is positioned as central to place-making and addressing physical and mental health and well-being through built environment interventions. The importance of open spaces within higher density residential development is promoted.

At a local authority level, two recent developments have the potential to significantly advance green space as being central to enhancing local quality of life, health and well-being:

1. First, the advancement of the Healthy Cities and Counties approach in Ireland provides an opportunity to develop locally tailored solutions for enhancing health and well-being and for developing collaborative “problem solving”. This approach has the potential to develop new policy relationships at a local level that can provide more integrative HiAP solutions. There is significant but largely untapped potential to embed Healthy Cities and Counties approaches in formulating local development plans that integrate health into the sustainable management of land use and spatial guidance at a local authority level.
2. Second, green infrastructure approaches have been adopted widely by local planning authorities and are identified within the NPF as being central to sustainable land management. This approach enables an integrative framework for planning authorities to enhance, restore and create green infrastructure assets within a multiscalar, multifunctional ecological and green space network. However, at present, green infrastructure policies and practices tend to emphasise biodiversity goals or flood mitigation measures. In this regard, there is greater scope for planning authorities to more fully explore the health services that green infrastructure provide and to maximise the health benefits from any green infrastructure interventions.

In summary, there is a scientific consensus that green space provides benefits for enhancing health and well-being and, moreover, these benefits and the multifunctional services provided by green space are increasingly recognised in policy at international, national and local levels. However, although such policy guidance clearly supports an emphasis on green space provision for population health and well-being, it does not provide detailed guidance for planning and design policy in terms of the specific attributes required to tackle lifestyle illnesses in multiple cohorts. This is partly because of the aggregation and homogenisation of different spatial typologies in much planning and design policy into a measure of so-called “green space”, without further qualification as to the type or quality of such spaces. To address this “implementation gap”, the Eco-Health project provides an enhanced evidence base to inform policy and green space design through:

- a life-course analysis of health benefits from green space (see Chapter 2);
- qualitative, in-depth interviews with key policy actors involved in green space provision, planning policy and Healthy Cities and Counties approaches, and policy analysis of international, national and local policies (see Chapter 3);
- a household survey and “choice experiments” in urban, suburban and rural localities to identify green space perceptions, use and attributes that encourage healthy behaviours (see Chapters 5 and 6);
- a participatory research approach to develop in-depth design insights with local citizens (see Chapter 7).

The benefits of green space highlighted in the scientific literature suggest that urban and rural residents should have adequate opportunities for accessing green space and exposure to nature. However, although focusing on the distribution, quantum and supply of green spaces and green infrastructure is an important element of effective green space planning, the findings of Chapters 2, 5 and 6 suggest that a more nuanced approach that also focuses on the multifunctional design of existing and new green spaces is key. The life-course analysis undertaken in Chapter 2 suggests that green space design and provision should be underpinned by an inclusive and evidence-informed approach that understands in greater detail the health “services” that different types of green spaces provide and also how these relate to diverse “user” needs across different cohorts. This suggests that enhancing green spaces as health-promoting environments requires consideration to be given to not only the proximity and accessibility of green space, but also the specific design attributes that afford different groups of people opportunities for healthy activities and how people’s needs vary over their life course. As such, it is clearly important to understand salient aspects of green space environments that have a bearing on health and quality of life for each cohort and subgroup. Knowledge from such research will help to identify and detail effective ways to plan and design healthy green spaces for all demographic and socio-economic cohorts in an Irish context. Chapter 2 identified key variations within and between population cohorts regarding the green space attributes that promote health and well-being, demonstrating how different

green space configurations afford different activities and promote different physical and psychological responses for different age groups. As such, this life-course approach facilitates a more nuanced understanding of those green space attributes that promote health and well-being than is normally evident in much research in this field, consequent on such research being generally cohort specific and focused on a particular selection of variables. Possible design interventions across different age cohorts are summarised in Table 2.6 that can help practitioners to cater for the needs of multiple user groups and to create inclusive health-promoting environments.

Similarly, Chapters 5 and 6 suggest that effective green space policy and planning is not simply a matter of “proximity” or distribution, but is also about design attributes – therefore, effective policy should explore adapting existing green spaces to maximise health benefits alongside the design of new health-promoting environments. For example, the local case study analysis suggested that the presence of green space does not always result in a shift in behaviour or its greater use as a health-promoting environment. Poorly designed green spaces may prioritise one potential group over another, thereby limiting their potential use – this is often the case with green spaces that are dominated by formal sports pitches that may limit more

informal recreational use. Similarly, poor access and limited walkways/cycleways connecting green spaces with residential areas can negatively impact on the perceptions and use of local green spaces. Therefore, in enhancing green spaces as health-promoting environments, consideration must be given to not only the quantity and distribution of green spaces, but also how different cohorts or groups in society can potentially benefit from green space and how existing green spaces can become more multifunctional and inclusive. Based on the research findings, key principles for designing green spaces for health benefits are outlined in Box 8.2.

8.3 Recommendations

8.3.1 *Green spaces as a public health investment*

The scientific evidence provides a robust case for widely adopting the enhancement and provision of green spaces as health-promoting environments. Therefore, investing in green space projects is an investment in public health and in a community’s social infrastructure that local authorities and public agencies can make on behalf of Irish citizens and their health and well-being.

Box 8.2. Green space principles

- Accessible spaces with good links (pedestrian and cycleways) to nearby neighbourhoods.
- A networked approach: emphasising green infrastructure networks (rather than isolated parks) can provide new opportunities for connecting existing and new green spaces and creating linkages between urban and rural areas. Examples include greenways and linear parks, local greenways or cycleways that link to regional and national greenways and de-culverting watercourses to provide new blue corridors.
- Inclusive in design, catering for local needs from young to old and all physical abilities. Green spaces that are designed to support very specific functions tend to attract limited groups of users.
- Well managed and maintained, creating a high-quality environment: poorly managed spaces or vandalism lead to negative perceptions among potential users.
- Multifunctional uses: examples include spaces that encourage active mobility, physical activity and sports, relaxation and tranquillity, and opportunities for social exchange (e.g. that incorporate community gardens or encourage parkruns).
- Enhance urban greening through planting strategies that mitigate noise and air pollution and maximise local biodiversity gain and facilitate sustainable drainage (e.g. deciduous wooded and wildflower meadow areas).
- Create multisensory restorative environments that help mitigate the psychological stresses of modern living through the provision of “restive places for rejuvenation”.

- **Eco-Health R1.** Green spaces should be framed as *essential infrastructure* in delivering high-quality, liveable urban, suburban and rural communities.
- **Eco-Health R2.** Green spaces should be viewed as a key means for local authorities and public bodies to deliver on high-level policy commitments, such as implementing Ireland's commitments to the UN SDGs, and to implement a HiAP approach, as envisaged by Healthy Ireland.
- **Eco-Health R3.** Within the context of anticipated climate change, well-designed green spaces can help "future-proof" urban areas from the urban heat island effect and increasing risks associated from heavy rainfall and surface run-off-related flooding.

8.3.2 Institutional and governance arrangements

Emerging practices surrounding the Healthy Cities and Counties approach in Ireland point to the value of developing health and well-being policies tailored to local contexts, involving multiple stakeholders and local people in the design and implementation of Healthy Cities and Counties strategies.

- **Eco-Health R4.** The Healthy Cities and Counties approach should be mainstreamed across all Irish local authorities to provide a means to decentralise health and well-being practices and to provide effective local arenas for participation and collaborative problem-solving.
- **Eco-Health R5.** There is significant potential for further integration of the Healthy Cities and Counties approach into the local authority statutory development plan process, to ensure that the concept of healthy places is embedded within land use regulation and spatial guidance. At present, planning and local health and well-being promotion have remained largely separate; however, encouragingly, key actors recognise the potential for developing new synergies. A more integrated approach could be achieved by (1) following the lead of the NPF and including a development plan section addressing healthy communities; (2) embedding the Healthy Cities and Counties co-ordinator in the development plan process; and (3) developing local champions among elected councillors for promoting health concerns within planning processes through training and dedicated support from an authority's executive branch.
- **Eco-Health R6.** Healthy Cities and Counties co-ordinators or local health promotion specialists should work alongside local authority parks and planning departments or public bodies involved in green space provision to widely promote and brand green spaces as health-promoting environments. Local campaigns could highlight "green health" or "green exercise", in terms of both the benefits and the opportunities for a more active lifestyle.
- **Eco-Health R7.** Local authorities should establish green space steering groups responsible for the co-ordination of green space policy implementation at local authority level to maximise the multifunctional benefits of green spaces. The steering groups should meet on a regular basis to facilitate the discussion on green space-related management issues as they arise, for example in development management and plan production. Cross-departmental green space teams from adjoining planning authorities and relevant regional assemblies should meet a number of times per year to co-ordinate planning initiatives across administrative boundaries, providing opportunities for a regional approach, such as regional or national greenways.
- **Eco-Health R8.** Aligned with SEA, local authorities should undertake HIAs to ensure that population health is properly and proportionately considered in the formulation of alternative development scenarios. Such assessment should extend beyond environmental hazards and consider longer term and more broadly defined health and well-being impacts. Given that different people have different capacities, interests and needs, all development scenarios should respect population characteristics and consider the health and well-being implications for different groups in society. Only scenarios that are responsive to multiple age cohorts and all physical abilities should be considered. By evaluating the potential impact of each "alternative development scenario", planners can establish which development scenarios (including green infrastructure aspects) are best aligned with health and well-being objectives.

8.2.3 Enhance green space within local authority statutory planning

Local authority planning departments have a key role to play in the provision and enhancement of green spaces through statutory zoning policies, design guidance, development standards for new development and the protection of existing green spaces and green infrastructure resources. The NPF provides an enabling framework and important departure point for local authorities to centralise policies that deliver healthy communities, urban liveability and quality of life, and the protection and enhancement of ecological networks. However, it is within local authorities – at the point of implementation – where the translation of policy objectives into actual development proposals and green space designs takes place.

- **Eco-Health R9.** Green spaces should be viewed as integral to delivering high-quality, liveable urban places (e.g. Figure 8.1). The NPF emphasises compact urban forms with higher residential densities (often characterised by less private open

space). Providing networks and appropriate mixes of different types of green spaces and a green public realm should be viewed as an essential component of future urbanisation.

- **Eco-Health R10.** Local development plans should embed green space policies within green infrastructure frameworks and networks. Green infrastructure thinking has been increasingly utilised by planning authorities to rethink green spaces as key environmental assets that deliver a range of ecosystem services. The benefits of this approach include an emphasis on multifunctionality (i.e. green spaces that deliver a range of benefits), a multiscale framework (i.e. from micro green infrastructure interventions, such as green roofs, to regional and national greenways that connect urban and rural places) and a focus on networks (i.e. from preserving specific sites to developing ecological networks, connected through corridors and linking elements).
- **Eco-Health R11.** Green infrastructure approaches are also useful as they apply equally to urban, suburban and rural localities and communities.



Figure 8.1. Integrating green infrastructure into LAPs. This example is from the Naas Road LAP, Dublin City Council, illustrating the connections between green spaces through additional green infrastructure elements.

However, urban, suburban and rural places also require context-specific solutions tailored to local environmental conditions (see Chapters 5 and 6). Urban areas may require local pocket parks to promote accessibility and proximity to green spaces for local citizens, connected through small-scale green infrastructure interventions (e.g. urban greening measures). Suburban areas have much potential for green infrastructure enhancement because of lower population densities. These include the extended commuter belt to our major urban centres that developed rapidly during the Celtic Tiger era – here, an emphasis on retrofit green space may be most effective. Rural areas are often assumed to be well endowed with green and open spaces. However, accessible green spaces are often limited (i.e. farmland rather than public spaces) and safe walking and cycling infrastructure can be largely absent. In these instances, developing local greenways or green corridors may deliver the greatest benefits.

- **Eco-Health R12.** Through the development plan process, local authorities should provide a baseline of existing green space assets, providing an understanding of proximity to residential areas, accessibility and use by different groups. Identifying potential new green infrastructure or green space assets should also be examined.
- **Eco-Health R13.** Within the context of ecosystem services provided by green spaces, local plans should give greater consideration to health and well-being benefits, which will further inform the design of multifunctional green spaces.

8.3.4 Designing green spaces for health

Effective green space practice involves more than simply increasing the supply of green space; it also involves recognising that the design (or re-design) of green spaces can deliver different types of health benefits for different groups of people. Our research suggests that introducing different green space attributes can influence the local use of green space and healthy behaviours – these attributes provide environmental “conversion factors” that can provide pathways to a more healthy lifestyle. Our research also points to the need for an inclusive approach that addresses health inequalities across the life course, as well as socio-economic factors.

- **Eco-Health R14.** Maximising health benefits from green spaces should be central to the design process. An inclusive approach recognises that different cohorts or groups may require different types of green space attributes to provide health-promoting opportunities.
- **Eco-Health R15.** Designing green spaces for health should be evidence informed, making use of scientific evidence of green space health services and understanding the needs of local citizens in the design process.
- **Eco-Health R16.** A series of exemplar design guidelines for the development and management of green spaces and green infrastructure should be developed with a target audience of local authority officers, private sector developers, public infrastructure providers and built environment professions (architects, planners, civil engineers, landscape architects).

In Chapter 4, we introduced the idea of an “affordances star” as a relational framework for enhancing the quality of green space for health and well-being. In Figure 8.2 and Table 8.1, we set out how the affordances star can be used to frame key questions that providers and designers should consider in designing green spaces as health-promoting environments.

8.3.5 Co-design of green spaces to maximise health benefits

Although a substantial international evidence base exists on the sustainability benefits of urban greening and green infrastructure, translating knowledge into sustainable practices, behaviours and agreed design interventions represents a significant challenge. Evidence from our research suggests that this challenge can be exacerbated by well-meaning interventions that are nevertheless unresponsive to the specific use desires of local communities. Hence, it is necessary to mobilise knowledge into local solutions through developing innovative community engagement models that are sensitive to the aspirations of green space users and that promote ownership of such spaces and thereby enhance their use for health and well-being. It is in this context that we make the following recommendations:

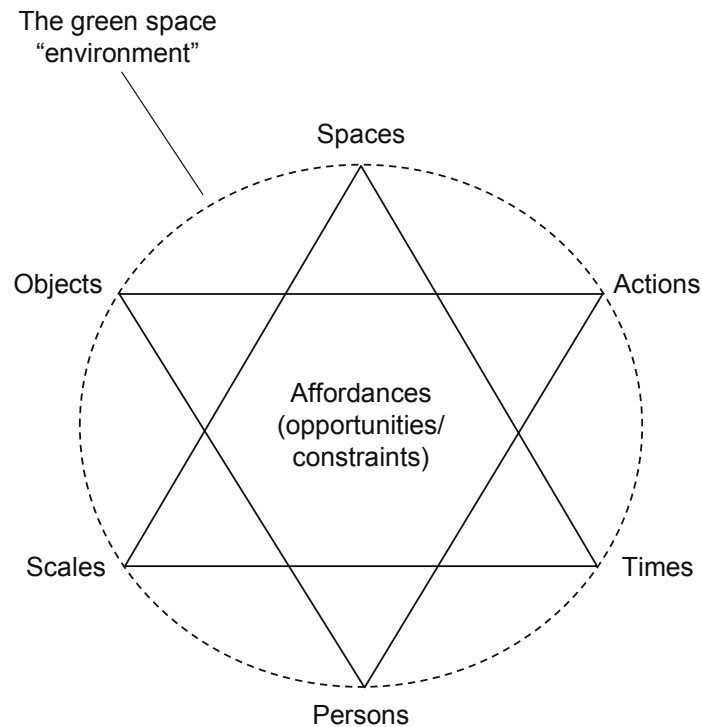


Figure 8.2. The “affordances star”: a relational framework for enhancing the quality of green space for health and well-being.

Table 8.1. Questions to consider when designing or retrofitting green spaces

Affordances	Questions
Spaces	- Do residents across different socio-economic backgrounds have equal access to green spaces? - Does the green space support or increase physical activity levels for all cohorts and physical abilities? - Does the green space enable active, sustainable transport modes (e.g. commuting by walking/cycling)? - Does the green space increase people’s contact with or exposure to nature? - Does the green space promote a positive multisensory experience (sound, smell, touch, sight)? - Does the green space serve as a community space that enhances opportunities for social interaction? - Does the green space support both active recreation and opportunities for informal activities and relaxation? - Does a local green space strategy consider proximity, access and exposure to various types and mixes of green space (e.g. small and large parks, formal sports pitches and opportunities for incidental activity, formal gardens along with biodiverse wildflower areas)?
Actions	- Does the green space planting strategy mitigate local air/noise pollution? - Does the green space vegetation positively impact on local air quality? - Have the maintenance needs of the green space been considered? Who is responsible for its management? - Are signs of vandalism dealt with quickly? - Can a planned green space be used to revitalise a disadvantaged area? - Is the green space designed as a flexible space so that it is adaptable to changes in use desire by local communities (e.g. are cycle tracks also suitable for looped parkruns)? - Has the local community been involved in the planning and design process? (further discussed below) - Have health professionals been engaged in the green space design?
Times	- Does the green space work effectively across different seasons and weather conditions (lighting, drainage, materials)? - Are play, exercise and socialisation areas supplied with lighting to facilitate late afternoon use in winter? - Does the green space provide shaded areas during warmer summer months or shelter in wetter or colder weather? - Does the green space provide adequate access across the day (e.g. not restricted to daylight hours only)? - Has the green space design considered safety concerns to encourage use at different times of day (e.g. passive surveillance, lighting, visibility)?

Table 8.1. Continued

Affordances	Questions
Person	- Does the design of the green space cater for different users and uses, giving consideration to age (e.g. young children, tweens, teenagers and young adults, adults of various ages through middle age and old age)? - Does the design of the green space cater for different users and uses, giving consideration to gender (ranging from safety considerations to catering for expectant mothers)? - Does the design of the green space cater for different users and uses, giving consideration to physical and sensory abilities (e.g. wheelchair users, those with walking aids, and those with visual or hearing impairments)? - Does the design of the green space cater for different users and uses, giving consideration to socio-cultural backgrounds (e.g. the time of day that green spaces are used at and preferred activities)? - Does the green space enhance social interaction and exchanges? - Does the green space support community building (e.g. incorporate a community garden or provide space for a parkrun)?
Scales	- Does the green space contain looped walks of different lengths/durations to cater for different groups/abilities? - Are urban, suburban and rural localities adequately served with green spaces? - Are green spaces networked within a green infrastructure approach, providing a user-legible network of green infrastructure assets (e.g. are greenway connections clearly signposted to facilitate use by different individuals across scales: the 5-km jogger; the 20-km commuter cyclist; the walker/runner/cyclist seeking a long day out crossing several landscape types)? - Are local green infrastructure assets connected to green infrastructure hubs or assets of regional and national significance (e.g. linking to regional greenways via new cycleways, developing new linear corridor elements in both urban and rural areas)? - Have green spaces been included in regional and county-wide planning frameworks to maximise connections? - Are green infrastructure assets linked across urban and rural space?
Objects	- Are green spaces designed in ways that include attributes responsive to a variety of user desires (e.g. ponds, woodland trails, natural and formal play spaces with adult seating)? - Having considered spaces, actions, times, persons and scales, does the green space contain adequate infrastructure to cater for the activities that diverse cohorts may require at any given time (e.g. benches, toilets, waste bins, handrails, sporting infrastructure, lamp posts, water fountains, communal seating areas, sheltered seating areas, food/drink stalls/kiosks)? - Has adequate signage been included and, where appropriate, sensory signage?

- **Eco-Health R17.** Include sections on green space location, design and accessibility in papers on issues published as part of plan-making initiatives.
- **Eco-Health R18.** Organise green infrastructure workshops with local communities at the beginning of plan-making initiatives to build community capital and local capacity in knowledge regarding green infrastructure (including green space for health and well-being) that can be subsequently harnessed and employed in the formulation of planning and design policy.
- **Eco-Health R19.** Organise green space co-design workshops with local communities to collaboratively develop enhancements to existing local green spaces, as well as the provision of new green spaces for health and well-being. These workshops should include relevant practitioners from local authorities (e.g. parks professionals, planners, community officers), a distribution of cohorts from across the life course, and residents of various physical abilities. Such workshops should be coherently linked to the

green infrastructure workshops recommended in R6 and R7 above and sequenced subsequent to these to facilitate ongoing capacity building.

- **Eco-Health R20.** Citizen science initiatives should be used to interest and involve communities in the planning and design of their local environments from a health and well-being perspective (e.g. a local authority-sponsored app development competition for schools that provides real-time information that is collated and viewable on a web portal, which can be used to inform the retrofitting and development of green spaces from a health and well-being perspective).

8.3.6 Capacity building requirements

A key deficit identified within the interviews with key informants related to a lack of knowledge or appropriate training for embedding health concerns within local authorities or public agencies responsible for green spaces and green infrastructure. This deficit results in green space planning being orientated

towards non-health objectives such as biodiversity or flood risk management. However, by increasing knowledge of the potential health benefits of green space, the multifunctionality of green space and green infrastructure can be enhanced and health services can become central in design and planning. The following capacity-building measures are recommended:

- **Eco-Health R21.** Develop and pilot a continuing professional development (CPD) “health and green infrastructure” programme for local authority officers in association with third-level institutes and professional institutes. CPD could target planners, parks department officers, community officers and engineers.
- **Eco-Health R22.** Build local government “buy-in” for integrating health into green space planning. Chief executive officer and management levels within local authorities should be targeted to build support for enhancing the local planning process to deliver health and well-being outcomes and also engaging with elected councillors to enhance capacity among elected representatives.
- **Eco-Health R23.** Organise a national green infrastructure and health planning conference

with the aim of advancing knowledge and the evidence base for enhancing green space as a health-promoting environment. This should focus on disseminating best national and international practices; evaluating prospects over the next 5–10 years; building political support for green spaces and healthy places; and overcoming potential barriers.

Irish third-level institute professional planning programmes should develop and incorporate an understanding of the environmental determinants of health as central to sustainable development. This should include a greater awareness of how planning shapes health outcomes, an appreciation of healthy places within plan-making and urban design, and the development of skills in interdisciplinary working and problem-solving (e.g. with civil engineers, landscape architects, ecologists).

- **Eco-Health R24.** Mainstream green infrastructure approaches within professional planning education.

Table 8.2 provides a summary of the Eco-Health recommendations.

Table 8.2. Summary of Eco-Health recommendations

Recommendation	Key stakeholders	Priority ^a
Green spaces as a public health investment		
R1: Green spaces should be framed as essential infrastructure in delivering high-quality, liveable urban, suburban and rural communities	DPHLG, regional assemblies, local planning authorities	1
R2: Green spaces should be viewed as a key means for local authorities and public bodies to deliver on high-level policy commitments, e.g. SDGs, NPF	Local authorities, regional assemblies, key public bodies, e.g. Coillte, Waterways Ireland	1
R3: Well-designed green spaces can help “future-proof” urban areas from climate change risks	DHPLG, regional assemblies, local planning authorities	1
Institutional and governance arrangements		
R4: The Healthy Cities and Counties approach should be mainstreamed across all Irish local authorities	Healthy Cities and Counties network, local authorities	2
R5: Integrate the Healthy Cities and Counties approach into the local authority development plan process, to embed healthy places within land use regulations and spatial guidance	Healthy Cities and Counties network, local authorities	2
R6: Healthy Cities and Counties co-ordinators or local health promotion specialists should work alongside local authority parks and planning departments or public bodies involved in green space provision to widely promote and brand green spaces as health-promoting environments	Healthy Cities and Counties co-ordinators, local health promotion officers (HSE), local planning authorities, local authority parks departments	1/2
R7: Local authorities should establish green space steering groups responsible for the co-ordination of green space policy implementation	Local authorities	2
R8: Local authorities should undertake HIAs to ensure that population health is considered in the formulation of alternative development scenarios	Local authorities, guidance prepared by the DPHLG/EPA	2/3

Table 8.2. Continued

Recommendation	Key stakeholders	Priority ^a
Enhance green space within local authority statutory planning		
R9: Green spaces should be viewed as integral to delivering high-quality, liveable urban places	DPHPLG, regional assemblies, local planning authorities	1
R10: Local development plans should embed green space policies within green infrastructure frameworks and networks	Local planning authorities	1
R11: Green infrastructure approaches apply equally to urban, suburban and rural localities and communities	DPHPLG, regional assemblies, local planning authorities	1
R12: Through the development plan process, local authorities should provide a baseline of existing green space assets and identify potential new green infrastructure or green space assets	Local planning authorities	1
R13: Local plans should give greater consideration to the health and well-being benefits of green infrastructure, which will further inform the design of multifunctional green spaces	Local planning authorities	1
Designing green spaces for health		
R14: Maximising health benefits from green spaces should be central to the design process	Green space providers, designers and managers	1
R15: Designing green spaces for health should be evidence informed	Green space providers, designers and managers	1/3
R16: A series of exemplar design guidelines for the development and management of green spaces and green infrastructure should be developed	Sponsored by DHPLG	2
Co-design of green spaces to maximise health benefits		
R17: Include sections on green space location, design and accessibility in issues papers published as part of plan-making initiatives	Local planning authorities	1
R18: Organise green infrastructure workshops with local communities at the beginning of plan-making initiatives to build community capital and capacity	Local planning authorities	1/2
R19: Organise green space co-design workshops with local communities to collaboratively develop enhancements to existing local green spaces, as well as the provision of new green spaces for health and wellbeing	Local planning authorities	1/2
R20: Citizen science initiatives should be used to interest and involve communities in planning and design	Further research needed	3
Capacity building requirements		
R21: Develop and pilot a CPD “health and green infrastructure” programme	Professional institutes, Eco-Health team	1/2
R22: Build local government “buy-in” for integrating health into green space planning	Professional institutes, Eco-Health team	1
R23: Organise a national green infrastructure and health-planning conference	EPA, HSE, professional institutes	1/2
R24: Mainstream green infrastructure approaches within professional planning education	Third-level institutes	2

^a1 = immediate; 2 = within 5 years; 3 = more research needed within the next 3–5 years.

DHPLG, Department of Housing, Planning and Local Government.

8.4 Future Research Directions

This research has demonstrated the potential of green spaces and green infrastructure as health-promoting environments, emphasising that health services are a key dimension of green spaces and green infrastructure. However, a number of future avenues of research emerged that would be useful to address in future projects:

- develop a transferable and scalable framework for community and practitioner green space strategy co-design and implementation to:
 - ensure the creation of environments responsive to the health and well-being desires of resident communities;
 - build and consolidate community capacity in green infrastructure;
 - enhance a sense of ownership and community investment in the spaces created;

- Use citizen science as a framework for monitoring or evaluating the health impacts of green spaces, for example citizen science approaches to data collection relating to air pollution or noise pollution impacts of green space design interventions;
- urban greening strategies: understanding the link between the provision of micro-urban greening interventions and health, such as urban trees, green roofs/walls, public realm greening;
- research focusing in-depth on specific disadvantaged cohorts (e.g. teenagers, older people);
- greater use of qualitative tools for the measurement of health benefits from green spaces, such as participatory geographic information system (GIS) mapping and real-time recording of psychological responses to green space and nature.

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Abbreviations

ADHD	Attention deficit hyperactivity disorder
ASC	Alternative-specific constant
BMI	Body mass index
CA	Capability approach
CPD	Continuing professional development
CSO	Central Statistics Office
CVD	Cardiovascular disease
DCE	Discrete choice experiment
DTTS	Department of Transport, Tourism and Sport
EPA	Environmental Protection Agency
EU	European Union
GAA	Gaelic Athletic Association
HIA	Health Impact Assessment
HiAP	Health in all policies
HSE	Health Service Executive
LAP	Local area plan
LL	Log likelihood
MNL	Multinomial logit
NGO	Non-governmental organisation
NPF	National Planning Framework
NPWS	National Parks and Wildlife Service
RPL	Random parameters logit
SD	Standard deviation
SDG	Sustainable Development Goal
SEA	Strategic Environmental Assessment
UN	United Nations
WHO	World Health Organization
WP	Work package

Appendix 1 Useful Online Resources

Additional information on the Eco-Health project can be accessed at www.ecohealth.ie. All web-links below correct at time of publication (last accessed 12 December 2019).

A1.1 Global Resources

United Nations. Habitat III: <https://unhabitat.org/habitat-iii/>

United Nations. Sustainable Development Goals: <https://sustainabledevelopment.un.org/?menu=1300>

United Nations. The New Urban Agenda: <http://habitat3.org/the-new-urban-agenda/>

World Health Organization. *Urban Green Spaces and Health: A Review of Evidence*: https://www.euro.who.int/__data/assets/pdf_file/0005/321971/Urban-green-spaces-and-health-review-evidence.pdf?ua=1

A1.2 European Resources

European Commission. EU policy on the urban environment: http://ec.europa.eu/environment/urban/index_en.htm

European Commission. European Green Capital initiative: <http://ec.europa.eu/environment/europeangreencapital/>

European Commission. Green infrastructure: http://ec.europa.eu/environment/nature/ecosystems/index_en.htm

Eurostat. Urban Europe – statistics on cities, towns and suburbs – green cities: https://ec.europa.eu/eurostat/statistics-explained/index.php/Urban_Europe_-_statistics_on_cities,_towns_and_suburbs_-_green_cities

World Health Organization Regional Office for Europe: <http://www.euro.who.int/en/health-topics/environment-and-health/urban-health/publications/>

A1.3 European Country Resources

CABE. *Green Space Strategies: A Good Practice Guide*: <http://webarchive.nationalarchives.gov.uk/20110118142343/http://www.cabe.org.uk/files/green-space-strategies.pdf> (UK).

City of Amsterdam. Green space policy: <https://www.amsterdam.nl/en/policy/policy-green-space/> (the Netherlands).

European Union. *The Governance of Urban Green Spaces in Selected EU Cities. Green Surge, EU FP7 Project*: <https://library.wur.nl/WebQuery/wurpubs/fulltext/333699> (pan-European).

Faculty of Public Health and Natural England. *Great Outdoors: How our Natural Health Service Uses Green Space to Improve Wellbeing. An Action Report*: <http://www.getirelandactive.ie/Professionals/Built%20Environment/Research/UK-health-and-green-spaces-report-.pdf> (UK)

Leibniz Institute of Ecological Urban and Regional Development. *A Strategy for Urban Green Space*: https://www.ioer.de/greenkeys/Greenkeys_Tools/files_manual/GreenKeys_manual_Chap_2_250808.pdf (Germany).

Scottish Natural Heritage. General guidance: green networks, greenspace and outdoor access: <https://www.nature.scot/professional-advice/planning-and-development/natural-heritage-advice-planners-and-developers/planning-and-development-green-networks-and-greenspace> (Scotland).

A1.4 Irish Resources

Coillte. *Outdoor Recreation Plan for Public Lands and Waters in Ireland 2017–2021*: https://www.coillte.ie/media/2017/06/ORP_Screen.pdf

Economic and Social Research Institute. *Urban Green Space and Obesity in Older Adults*: <https://www.esri.ie/publications/urban-green-space-and-obesity-in-older-adults/>

Environmental Protection Agency. *Health Benefits from Biodiversity and Green Infrastructure*: <http://www.epa.ie/pubs/reports/research/health/research195.html>

Environmental Protection Agency. *Integrating Ecosystem Approaches, Green Infrastructure and Spatial Planning (ECO-Plan)*: <http://erc.epa.ie/safer/iso19115/displayISO19115.jsp?isoID=3138>

Environmental Protection Agency. *Using Knowledge to Protect and Improve our Natural Environment and Human Health*: <http://www.epa.ie/researchandeducation/research/>

GBI-Health. Green and blue infrastructure and human health: <https://gbihealthireland.com/>

Get Ireland Active. Promoting physical activity in Ireland: <http://www.getirelandactive.ie/>

Government of Ireland. *A Healthy Weight for Ireland: Obesity Policy and Action Plan 2016–2025*: <https://health.gov.ie/wp-content/uploads/2016/09/A-Healthy-Weight-for-Ireland-Obesity-Policy-and-Action-Plan-2016-2025.pdf>

Government of Ireland. *Healthy Ireland – A Framework for Health and Wellbeing*: <https://www.hse.ie/eng/services/publications/corporate/hieng.pdf>

Irish Sports Council. Irish trails: <https://www.irishtrails.ie/>

Irish Wheelchair Association. Designing accessible environments: <https://www.iwa.ie/downloads/about/iwa-access-guidelines.pdf>

National University of Ireland, Galway. Nature and Environment to Attain and Restore (NEAR) Health: <http://www.nuigalway.ie/near-health/>

UCD Urban Institute Ireland, Dún Laoghaire-Rathdown Council Council and Fingal County Council. *Green City Guidelines*: <https://www.ucd.ie/t4cms/GreenCitiesGuidelines.pdf>

Urban Forum. *Green Infrastructure: A Quality of Life Issue*: <http://www.irishlandscapeinstitute.com/wp-content/uploads/2012/08/GreenInfrastructure.pdf>

AN GHNÍOMHAIREACHT UM CHAOMHNÚ COMHSHAOIL
Tá an Gníomhaireacht um Chaomhnú Comhshaoil (GCC) freagrach as an gcomhshaoil a chaomhnú agus a fheabhsú mar shócmhainn luachmhar do mhuintir na hÉireann. Táimid tiomanta do dhaoine agus don chomhshaoil a chosaint ó éifeachtaí díobhálacha na radaíochta agus an truaillithe.

Is féidir obair na Gníomhaireachta a roinnt ina trí phríomhréimse:

Rialú: Déanaimid córais éifeachtacha rialaithe agus comhlionta comhshaoil a chur i bhfeidhm chun torthaí maithe comhshaoil a sholáthar agus chun díriú orthu siúd nach gcloíonn leis na córais sin.

Eolas: Soláthraimid sonraí, faisnéis agus measúnú comhshaoil atá ar ardchaighdeán, spriocdhírthe agus tráthúil chun bonn eolais a chur faoin gcinnteoireacht ar gach leibhéal.

Tacaíocht: Bimid ag saothrú i gcomhar le grúpaí eile chun tacú le comhshaoil atá glan, táirgiúil agus cosanta go maith, agus le hiompar a chuirfidh le comhshaoil inbhuanaithe.

Ár bhFreagrachtaí

Ceadúnú

Déanaimid na gníomhaíochtaí seo a leanas a rialú ionas nach ndéanann siad dochar do shláinte an phobail ná don chomhshaoil:

- saoráidí dramhaíola (*m.sh. láithreáin líonta talún, loisceoirí, stáisiúin aistrithe dramhaíola*);
- gníomhaíochtaí tionsclaíocha ar scála mór (*m.sh. déantúsaíocht cógaisíochta, déantúsaíocht stroighne, stáisiúin chumhachta*);
- an diantalmhaíocht (*m.sh. muca, éanlaith*);
- úsáid shrianta agus scaoileadh rialaithe Orgánach Géinmhodhnaithe (*OGM*);
- foinsí radaíochta ianúcháin (*m.sh. trealamh x-gha agus radaiteiripe, foinsí tionsclaíocha*);
- áiseanna móra stórála peitril;
- scardadh dramhuisce;
- gníomhaíochtaí dumpála ar farraige.

Forfheidhmiú Náisiúnta i leith Cúrsaí Comhshaoil

- Clár náisiúnta iniúchtaí agus cigireachtaí a dhéanamh gach bliain ar shaoráidí a bhfuil ceadúnas ón nGníomhaireacht acu.
- Maoirseacht a dhéanamh ar fhreagrachtaí cosanta comhshaoil na n-údarás áitiúil.
- Caighdeán an uisce óil, arna sholáthar ag soláthraithe uisce phoiblí, a mhaoirsiú.
- Obair le húdaráis áitiúla agus le gníomhaireachtaí eile chun dul i ngleic le coireanna comhshaoil trí chomhordú a dhéanamh ar líonra forfheidhmiúcháin náisiúnta, trí dhíriú ar chiontóirí, agus trí mhaoirsiú a dhéanamh ar leasúchán.
- Cur i bhfeidhm rialachán ar nós na Rialachán um Dhramhthrealamh Leictreach agus Leictreonach (DTLL), um Shrian ar Shubstaintí Guaiseacha agus na Rialachán um rialú ar shubstaintí a ídionn an ciseal ózóin.
- An dlí a chur orthu siúd a bhriseann dlí an chomhshaoil agus a dhéanann dochar don chomhshaoil.

Bainistíocht Uisce

- Monatóireacht agus tuairisciú a dhéanamh ar cháilíocht aibhneacha, lochanna, uisce idirchriosacha agus cósta na hÉireann, agus screamhuisc; leibhéil uisce agus sruthanna aibhneacha a thomhas.
- Comhordú náisiúnta agus maoirsiú a dhéanamh ar an gCreat-Treoir Uisce.
- Monatóireacht agus tuairisciú a dhéanamh ar Cháilíocht an Uisce Snámha.

Monatóireacht, Anailís agus Tuairisciú ar an gComhshaoil

- Monatóireacht a dhéanamh ar cháilíocht an aeir agus Treoir an AE maidir le hAer Glan don Eoraip (CAFÉ) a chur chun feidhme.
- Tuairisciú neamhspleách le cabhrú le cinnteoireacht an rialtais náisiúnta agus na n-údarás áitiúil (*m.sh. tuairisciú tréimhsiúil ar staid Chomhshaoil na hÉireann agus Tuarascálacha ar Tháscairí*).

Rialú Astaíochtaí na nGás Ceaptha Teasa in Éirinn

- Fardail agus réamh-mheastacháin na hÉireann maidir le gáis cheaptha teasa a ullmhú.
- An Treoir maidir le Trádáil Astaíochtaí a chur chun feidhme i gcomhair breis agus 100 de na táirgeoirí dé-ocsaíde carbóin is mó in Éirinn.

Taighde agus Forbairt Comhshaoil

- Taighde comhshaoil a chistiú chun brúnna a shainaitheint, bonn eolais a chur faoi bheartais, agus réitigh a sholáthar i réimsí na haeráide, an uisce agus na hinbhuanaitheachta.

Measúnacht Straitéiseach Timpeallachta

- Measúnacht a dhéanamh ar thionchar pleananna agus clár beartaithe ar an gcomhshaoil in Éirinn (*m.sh. mórfhleananna forbartha*).

Cosaint Raideolaíoch

- Monatóireacht a dhéanamh ar leibhéil radaíochta, measúnacht a dhéanamh ar nochtadh mhuintir na hÉireann don radaíocht ianúcháin.
- Cabhrú le pleananna náisiúnta a fhorbairt le haghaidh éigeandálaí ag eascairt as taismí núicléacha.
- Monatóireacht a dhéanamh ar fhorbairtí thar lear a bhaineann le saoráidí núicléacha agus leis an tsábháilteacht raideolaíochta.
- Sainseirbhísí cosanta ar an radaíocht a sholáthar, nó maoirsiú a dhéanamh ar sholáthar na seirbhísí sin.

Treoir, Faisnéis Inrochtana agus Oideachas

- Comhairle agus treoir a chur ar fáil d’earnáil na tionsclaíochta agus don phobal maidir le hábhair a bhaineann le caomhnú an chomhshaoil agus leis an gcosaint raideolaíoch.
- Faisnéis thráthúil ar an gcomhshaoil ar a bhfuil fáil éasca a chur ar fáil chun rannpháirtíocht an phobail a spreagadh sa chinnnteoireacht i ndáil leis an gcomhshaoil (*m.sh. Timpeall an Tí, léarscáileanna radóin*).
- Comhairle a chur ar fáil don Rialtas maidir le hábhair a bhaineann leis an tsábháilteacht raideolaíoch agus le cúrsaí práinnfhreagartha.
- Plean Náisiúnta Bainistíochta Dramhaíola Guaisí a fhorbairt chun dramhaíl ghuaiseach a chos agus a bhainistiú.

Múscailt Feasachta agus Athrú Iompraíochta

- Feasacht chomhshaoil níos fearr a ghiniúint agus dul i bhfeidhm ar athrú iompraíochta dearfach trí thacú le gnóthais, le pobail agus le teaghlaigh a bheith níos éifeachtúla ar acmhainní.
- Tástáil le haghaidh radóin a chur chun cinn i dtithe agus in ionaid oibre, agus gníomhartha leasúcháin a spreagadh nuair is gá.

Bainistíocht agus struchtúr na Gníomhaireachta um Chaomhnú Comhshaoil

Tá an ghníomhaíocht á bainistiú ag Bord lánaimseartha, ar a bhfuil Ard-Stiúrthóir agus cúigear Stiúrthóirí. Déantar an obair ar fud cúig cinn d’Oifigí:

- An Oifig um Inmharthanacht Comhshaoil
- An Oifig Forfheidhmithe i leith cúrsaí Comhshaoil
- An Oifig um Fianaise is Measúnú
- Oifig um Chosaint Radaíochta agus Monatóireachta Comhshaoil
- An Oifig Cumarsáide agus Seirbhísí Corparáideacha

Tá Coiste Comhairleach ag an nGníomhaireacht le cabhrú léi. Tá dáréag comhaltaí air agus tagann siad le chéile go rialta le plé a dhéanamh ar ábhair inní agus le comhairle a chur ar an mBord.

Eco-Health: Ecosystem Benefits of Greenspace for Health



Authors: Mark Scott, Mick Lennon, Owen Douglas and Craig Bullock

Identifying Pressures

The Eco-Health project advances the perspective that accessible and well-designed green spaces are essential infrastructure, fundamental to the health and wellbeing of thriving and inclusive communities. There is a scientific consensus that well-designed green space provides multiple benefits for enhancing health and well-being. Enhancing green space provision, access and design:

- **Promotes physical activity** through creating spaces for play, recreation, walking and cycling within a safe environment.
- **Enhances mental well-being** through creating urban refuges (from busy streets, traffic, noise) and providing a restorative environment through increased contact with nature.
- **Enhances social interaction** through providing opportunities for social contact, public places and community-building activities.
- **Reduces environmental risks from pollution** by mitigating air pollution and noise pollution through urban greening.
- **Mitigates environmental risks from extreme weather** through countering the urban heat island effect and acting as a “sponge” within the context of extreme rainfall or surface flooding. Both warmer and wetter weather are anticipated as impacts of climate change in Ireland; thus, future-proofing Irish urban areas against further risks is crucial.

Informing Policy

The Eco-Health project seeks to inform public health and spatial planning policy and the important interlinkages between environmental quality and health and well-being. Healthy Ireland (2013) embraces the shift from a health services focus and treating ill health towards a “whole-systems approach” to health and well-being. This approach recognises that positive health outcomes not only are determined by inherited individual characteristics, but also are influenced by contextual factors, including the social and environmental determinants of health. From the perspective of spatial planning, the concept of healthy places is increasingly espoused internationally and nationally. By enhancing the provision and design of green spaces, local authorities and public agencies can contribute towards key objectives within the National Planning Framework (2018) relating to healthy communities, compact growth and sustainable land use management.

However, although such policy guidance clearly supports an emphasis on green space provision for population health and well-being, it does not provide detailed guidance for planning and design policy in terms of the specific attributes required to tackle lifestyle illnesses in multiple cohorts.

Developing Solutions

Key design principles to maximise green spaces as health-promoting environments include:

- **Accessible spaces** with good links (pedestrian and cycleways) to nearby neighbourhoods.
- **A networked approach:** emphasising *green infrastructure* networks (rather than isolated parks) can provide new opportunities for connecting existing and new green spaces and creating new linkages between urban and rural areas.
- **Inclusive in design**, catering for local needs from young to old and all physical abilities. Green spaces that are designed to support very specific functions tend to attract limited groups of users.
- **Well managed and maintained spaces**, creating a high-quality environment: poorly managed spaces or vandalism prompt negative perceptions among potential users
- **Multifunctional uses:** examples include spaces that encourage active mobility, physical activity and sports, relaxation and tranquillity, and opportunities for social exchange (e.g. that incorporate community gardens, encourage parkruns).
- **Enhancement of urban greening through planting strategies** that mitigate noise and air pollution and maximise local biodiversity gain and facilitate sustainable drainage (e.g. deciduous wooded and wildflower meadow areas).
- **Creation of multisensory restorative environments** that help mitigate the psychological stresses of modern living through the provision of “restive places for rejuvenation”.