

Chapter 19

Linking Landscape Planning and Health



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Abstract Aims and measures in landscape planning often align with aims for positive health outcomes, even if these are not explicitly mentioned in the planning documents. This chapter examines whether, and if so how, health issues are already being tackled in formal and informal landscape planning instruments in Germany and the UK at present and how this could be enhanced in the future. Thus, the focus is on planning issues, practice and methods. In addition, health-promoting features of green spaces, regarding both single green spaces and entire green space systems, are considered, as well as a method for planning greenway systems for daily physical mobility. Addressing health issues in landscape planning is a necessary part of sustainable planning in order to be able to cope with future developments, such as increasing climate change impacts and accelerating societal changes. For this reason, interdisciplinary corporation between landscape planning and the health sector should be strengthened.

Keywords Landscape planning · Open space planning · Local plans · Health promotion · Greenways for mobility · Green infrastructure

Highlights Integrating health issues into landscape planning holds manifold benefits for both sides.

- Potentials to include health issues in landscape planning are not yet fully used.
- Considering human health in landscape planning can be done in different ways and with different intensities.

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- Planning ‘greenways for mobility’ is an appropriate way to include health issues.
- Landscape planning must tackle key societal problems to be socially acknowledged.

19.1 Introduction

Multiple studies now suggest that access to green or natural environments may play an important role in supporting public health, including mitigating air and water pollution, offering opportunities for healthy activities and contributing to better mental health (WHO 2016). This has been triggered in part by the challenges of climate change, especially increases in the urban heat-island effect, and the effects of urban densification in an increasingly urbanised society, which may have both positive and negative consequences for the health of urban residents. To tackle these challenges, health issues must be integrated into spatial and urban as well as landscape planning, taking into account the potential for multiple positive health effects from urban green spaces and elements. However, there are many difficulties in determining how to guide and regulate such plans in the context of other demands for sustainable and cost-effective urban development (Wolch et al. 2014).

While green spaces exert many positive effects on human health, or at least have the potential to do so, they can at the same time be of great importance for protecting developing biodiversity. However, it should be noted that ‘green’ space, especially in urban areas, does not necessarily contribute to biodiversity (especially its *in situ* protection) as it comprises, for example, sport grounds, intensively used grassland, private gardens and monoculture cropland or forests. Nonetheless, even sites like these, despite certain adverse environmental effects (e.g. groundwater pollution), can also have positive environmental and human health benefits that should not be overlooked, even if they often could be enhanced, especially in terms of biodiversity.

In this chapter, health is understood according to the definition of the World Health Organization (WHO) as a state of complete physical, mental and social well-being (WHO 2017a). Consequently, for the purpose of our interest in environment-health links, health can be divided into social, mental, physical and aesthetic-symbolic components (the last category meaning that urban green could, for example, symbolise good human-nature relationships to a person, which might support their well-being), which need to be considered equally (Rittel et al. 2014, 2016).¹ Moreover, health promotion should be distinguished from health protection: health protection refers to preventing potential health risks and diseases, whereas health promotion focuses on maintaining health, strengthening health resources and establishing health-promoting environments (*ibid.*).

¹The publications by Rittel et al. (2014, 2016) are identical, the version from 2016 is the English translation of the original publication in German (2014). From here on we quote only Rittel et al. (2016).

By the term ‘landscape planning’ we refer to all formal and informal planning instruments and procedures aimed at protecting, managing, designing, redesigning and maintaining green spaces and green elements, especially in an urban environment, including elements such as street trees and façade greening. Thus, the term covers a broad range of instruments in the realm of nature conservation, landscape architecture and urban or land use planning. Referring to the planning systems and instruments of Germany and the UK, respectively, we focus on the official instruments of landscape planning in Germany and on Local Plans or Core Strategies of Local Development Frameworks (official) as well as Green Infrastructure strategies (informal) in England as a part of the UK. This concentration on two countries is due, first, to the authors’ main areas of expertise, and second, to the heterogeneity of planning systems in different countries across Europe, to which we cannot do justice in one book chapter. Nonetheless, we think that many recommendations might also be applicable to or adaptable by other countries.

This chapter does not concentrate on the health effects of urban green space and biodiversity, as these have been covered comprehensively in previous chapters (see Part I; Marselle et al. Chap. 9; Cook et al. Chap. 11, all this volume). Instead, our aim is to show whether and how health issues are already being tackled in formal and informal landscape planning instruments in Germany and the UK, and how this could be enhanced in the future. As research and practical gaps can be found in the incorporation of health aspects into landscape and spatial planning, our chapter focuses on planning issues, practice and methods. Furthermore, we present health-promoting features of green spaces, including single green spaces as well as entire green space systems, and present a method for planning a greenway system for daily physical mobility.

19.2 Benefits of Considering Health Issues in Landscape Planning

Aims and measures in landscape planning often align with positive health effects, even if those are not explicitly mentioned. To give some examples: the conservation of biodiversity and species-rich habitats often also safeguards aesthetically pleasing recreational areas; clean lakes and rivers can serve as important habitats as well as bathing waters or for the supply of drinking water; soil conservation contributes to food security and to groundwater recharge and rainwater retention during heavy rains, and thus reduces the risk of flooding, including associated health risks. Furthermore, climate change, demographic changes, changes in lifestyle, and – not least – increased urbanization demanding new residential areas can have effects on urban, but also rural, green spaces. Consequently, these factors have implications for landscape planning and for human health and health protection and promotion. Recreation is strongly related to health and is a topic that has been thoroughly considered for some time in landscape planning. Even here, however, it must be

acknowledged that conflicts in landscape planning might also appear, for example, regarding the use of allergenic plants or the promotion of vector-borne diseases as an unintended side effect of promoting urban green (Damialis et al. Chap. 3, this volume; WHO 2016).

Consequently, there is considerable evidence that addressing health issues in landscape planning is helpful, indeed necessary, in order for planning authorities to be able to cope with future developments, and in order to make use of potential synergies and to mitigate conflicts and unintended negative side effects of planning. Furthermore, under conditions of increasing climate change impacts and accelerating societal changes, landscape planning, landscape architecture and nature conservation will only play a significant role for politicians and decision-makers if such disciplines are able to contribute to the solution of urgent societal challenges – such as health protection and promotion (see Heiland 2017, 183ff.). As Prüss-Ustün et al. (2017, p. 474) have said, “Investing in environmental interventions pays off for governments; it reduces the transfer of hidden costs from other sectors to the health sector”. Conversely, there will be no future for landscape planning if it concentrates only on biodiversity, as it will always take a backseat against other interests – however important from an expert’s perspective – such as health, social issues, drinking water supply and economic questions for the broader public and in politics.

It is important, therefore, to underline the need for interdisciplinary cooperation between landscape planning and the health sector (see Cook et al. Chap. 11, this volume). A mere consideration of health in landscape planning is not sufficient; there are greater opportunities for both sides from fuller collaborative working, and these should therefore be a priority: “While a new environmental conceptualisation of health [Ecological Public Health] might seem a difficult and complex task, that is the 21st century’s unavoidable task” (Rayner and Lang 2012, p. 52). Nonetheless: It is a challenging task as it requires cooperation across disciplines and administrations with different approaches, aims, values and languages. For example, whereas landscape planners’ thinking is primarily spatially based, the approach of health promotion is oriented towards the individual (Rittel et al. 2016, p. 20). As shown by Rittel et al. (2016) in the example of four case-study municipalities in Germany, an intensified cooperation between authorities responsible for nature conservation, landscape and green space planning on the one hand and health authorities on the other is hampered by factors that differ according to the size of municipality: in smaller municipalities, health authorities do not exist (as they are located at a county level), whereas in bigger cities they exist in a very differentiated, non-standardised way, which makes it difficult to identify the appropriate contact person for every planning issue. Furthermore, public health planning and longer term visions for supporting health may be beyond the usual concern of the relevant tier of health authority, e.g. of local clinical commissioning groups in the UK, which manage delivery of local health services. In the UK, landscape planning issues may be better understood at a national level, e.g. by Public Health England. Limited resources and competence are additional reasons that make cooperation difficult, factors that may well apply to other countries as well as the UK and Germany. Nonetheless: “The ‘healthy city’ (...) can only be understood as an interdisciplinary task and as the product of a

concerted effort of many actors” (Klages 2012, p. 323, translation by the authors). This statement also applies to the ‘climate-resilient, green and biodiverse city’.

19.3 Health as an Issue in Local Landscape Planning in Germany and the UK – The Status Quo

In order to understand how health issues are considered in landscape planning in Germany and the UK, it is necessary to know some basics about their planning systems, which are briefly introduced. This serves to clarify why we have chosen certain instruments for a deeper investigation. Finally, at the end of this section, we note our findings regarding the recent considerations of health in landscape planning.

19.3.1 *The (Landscape) Planning System in Germany*

Landscape Planning in Germany is an independent official planning instrument regulated by §§ 8–12 of the German Federal Nature Conservation Act (Bundesnaturschutzgesetz – BNatSchG) and the respective sections of the nature conservation acts of the 16 German federal states.² Landscape Planning generally exists on four different spatial-administrative levels or tiers: federal state, region (or similar administrative units, e.g. counties), municipalities, and partial areas of municipalities. On each of these levels, landscape plans cover the entire planning area, which means they comprise settlements as well as non-settlement areas (the only exception being North Rhine-Westphalia). Landscape planning aims to achieve the objectives of nature conservation as laid down in § 1 of the Federal Nature Conservation Act (BNatSchG) through protection, management, development and restoration of nature and landscapes. These objectives are the long-term safeguarding of: (1) biological diversity; (2) the performance and functioning of ecosystems, including their ability to regenerate, and the sustainable provisioning of natural resource functions; and (3) the diversity, uniqueness and beauty as well as the recreation value of nature and landscapes. Thus, landscape planning serves as a spatially oriented sectoral planning instrument for nature conservation, and delivers an ‘ecological contribution’ to comprehensive land use and spatial planning and other sectoral plans, such as traffic, agricultural and forestry planning. Requirements formulated by the landscape plans have to be integrated into the respective spatial or land-use plans at the same spatial level in order to become legally binding. Nonetheless, spatial or land use plans and sectoral plans have to consider the

²In detail, legal regulations for Landscape Planning differ between the German federal states, e.g. in terms of planning levels and the integration of landscape planning issues into spatial planning. These differences can be neglected for the purposes of this chapter.

requirements of landscape plans, but can deviate from them if appropriate reasons are given in the planning process. Thus, there is a strong link between landscape and spatial planning (at the regional and federal state level) and land use planning (at the local level), even if landscape planning remains independent. Furthermore, all spatial and land use plans (and in some federal states, also landscape plans), are usually subject to a Strategic Environmental Assessment (SEA) according to the EU SEA Directive, by which potential impacts of plans on the environment and on human health are assessed. In the following text we concentrate on landscape plans at municipal level (aka ‘The local landscape plan’), as this is a sufficiently concrete level (scale usually 1:10.000), appropriate for considering health issues related to distinct areas; although health topics could also be an issue at other levels in the planning system.

19.3.2 The (Landscape) Planning System in the UK

In the UK, planning is devolved to the four countries of England, Wales, Scotland and Northern Ireland, whose enabling legislation and guidance tools are largely country-specific (Winter et al. 2016). The English planning system, on which we put a certain focus here, differs strongly from the German one; with the ‘Localism Act’ of 2011 the regional planning tier was abolished and almost all planning responsibility was conferred to the local level. The only guidance for local planning is given by the ‘National Planning Policy Framework’ (NPPF, Department for Communities and Local Government 2012), which has to be “taken into account in the preparation of local and neighbourhood plans, and is a material consideration in planning decisions” (ibid., p. 1), the legislative basis of which are the ‘Planning & Compulsory Purchase Act’ (2004) and the ‘Town and Country Planning Regulations’ (2012). Local Plans have taken over the function of the former ‘Local Development Frameworks,’ which were a portfolio of different planning documents, with a ‘Core Strategy’ as their central element. Both kinds of local planning documents still co-exist and have to consider environmental and landscape issues, according to sections 9 (‘Protecting Green Belt land’) and 11 (‘Conserving and Enhancing the Natural Environment’) of the NPPF. Under the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, local planning authorities have a general responsibility to consider the environmental implications of developments that are subject to planning control. The 2017 Regulations integrate Environmental Impact Assessment (EIA) procedures into this framework but apply only to those projects that are likely to have significant effects on the environment, e.g. airports, major road developments; power generation installations; mining, etc.

Despite environmental issues only playing a subordinate role in the formal UK planning systems, no separate or independent landscape planning system exists. One could argue that this obvious neglect of environmental and landscape issues in UK land-use planning has led to attempts to fill that gap, for example, by a considerable amount of local and (sub-)regional level, informal planning instruments such as

‘Green Infrastructure Frameworks’ and ‘Green Infrastructure Strategies’ (for a comprehensive overview on the political and neo-liberal background of this development see Hehn 2016). Green Infrastructure (GI) is “a 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” (Department for Communities and Local Government 2012, p. 52). The respective definitions of GI can differ and include different types of ‘green’ (e.g. even light railway lines) or aquatic features such as rivers, canals and ponds (ibid.). GI strategies are prepared at a local level to establish, maintain and enhance a municipality’s GI, often not only to achieve ecological aims but also economic and social benefits (e.g. economic growth, property values, labor productivity, social cohesion, or quality of place) (Manchester City Council 2015). Many GI-strategies are explicitly aimed – amongst other things – at improving the health and well-being of residents. To some extent, aims or measures stated in GI strategies are incorporated into the Local Plans and/or Core Strategies and thereby influence official, legally binding plans. In the following sections we concentrate on Local Plans/Core Strategies and GI strategies, particularly regarding possible differences in how they tackle health issues.

19.3.3 Landscape Planning and Health in Germany

As there is a certain ‘traditional’ (even if criticised and contested) emphasis on biodiversity in landscape plans in Germany, human health has never been an important topic there. Although human health is mentioned in §1 BNatSchG as one reason for protecting nature, it doesn’t have the status of a ‘natural asset,’ which landscape planning is obliged to deal with. Consequently, considering health issues is a voluntary task, unless landscape plans are subject to a SEA, as is the case in some federal states. In such a case, potential health impacts of the landscape plan have to be assessed and valued, but still no kind of ‘pro-active planning for health,’ especially regarding health promotion, is required. Furthermore, differentiated knowledge about health effects of biodiversity, landscape and green spaces is often lacking amongst conservationists and landscape planners, at least if it reaches beyond the general notion that ‘a good environmental condition is the basis of human life.’ At the same time, health authorities are seldom involved in planning decisions. Consequently, very few landscape plans explicitly and pro-actively refer to human health (Rittel et al. 2016). Where this is done, it happens in the context of experiencing nature, urban green spaces and recreation, as in the local landscape plan of the city of Hohen Neuendorf (Stadt Hohen Neuendorf 2014) as an example.

Nonetheless there are many links to health issues in landscape planning in general, but also in the respective single planning documents. Human health is often addressed implicitly, e.g. when dealing with ‘recreation,’ but also when dealing with other issues, such as air purification, groundwater protection, soil conservation, climate change, etc. (see examples in Sect. 19.2 and more comprehensively in Sect. 19.4). But these connections – and therefore the relevance of conserving and

enhancing landscape and green spaces for human health – are not explicitly set out. As such, it has to be assumed that landscape-health relationships are largely irrelevant as a basis for political and administrative decisions, even if health impacts of intended land use changes have to be assessed by the SEA for local land-use plans, which, again, are mainly restricted to the avoidance or minimization of potential negative impacts of the plan, e.g. by noise and air pollution or the release of hazardous waste. More attention is paid to health in some informal planning concepts on urban development (Claßen and Meikel 2017; Rittel et al. 2016), but there is no strong link to landscape plans.

During the last few years, health has received increasing consideration in different documents (and sometimes additional funding) related to issues of landscape and urban green space planning, published by the German Ministry for Environment and Building (German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, BMUB)³ and the Federal Agency for Nature Conservation (BfN). In some cases, this is linked to the concepts of Green Infrastructure and Ecosystem Services, which, despite many possible points of critique (e.g. Heiland et al. 2016; Silvertown 2015), suggest an intention to raise awareness for a stronger consideration of health (and other human needs and interests) in nature conservation, landscape planning and landscape architecture. Examples include the ‘Federal Green Infrastructure Concept’ (BfN 2017a) and its underlying research report (Heiland et al. 2017), the reports of TEEB Germany for urban and rural areas (Naturkapital Deutschland – TEEB DE 2016a, b), the ‘Urban Green Infrastructure’ brochure with recommendations for municipalities (BfN 2017b) and the ‘White Paper on Urban Green’ (BMUB 2017). Rittel et al. (2016), being a result of a research project funded by the BfN, directly addresses municipalities in order to use synergies between landscape planning and health. It remains to be seen how these efforts and documents affect planning practice in the mid- to long-term perspective.

19.3.4 Landscape Planning and Health in the UK

As in Germany, public health has only become a formal consideration within the UK planning system relatively recently, although it should be noted that the promotion of public parks in urban areas in 19th century UK was premised on the need to protect the health of industrial workers. The current planning system is based conceptually on post-WW2 Town and Country Planning legislation, which made implicit (but not explicit) assumptions about the desirability of separating industrial zones from residential and recreational areas, in order to protect health.

Currently, Health Impact Assessment (HIA) across the UK is promoted by the government’s Department of Health (DH) as a means to assess the health impact of

³Since 2018: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

new government policy and its implementation (DH 2010a, b). Government guidance on the planning system states that local planning authorities should ensure that health and well-being and health infrastructure are considered in local and neighbourhood plans and in planning decision making. However, the use of HIA in the UK is only recommended as one way of considering the issues: “A health impact assessment may be a useful tool to use where there are expected to be significant impacts” (Ministry for Housing, Communities and Local Government 2014). Nonetheless, this guidance regards GI as a tool to link health and planning. It names safe and green open spaces as places for active play and food growing, and identifies green space accessibility by walking, cycling and public transport as attributes of a healthy community.

To gain insight into the current trend of incorporating health issues into the UK’s spatial plans, an analysis of ten English planning documents has been carried out: six Core Strategies/Local Plans and four GI Strategies, all published or adopted in 2010 or later.⁴ The planning documents were chosen to cover municipalities differing from one another in terms of inhabitants, size and geographical location as well as legal liability (Local Plans and Core Strategies being statutory, GI Strategies being informal and voluntary).⁵

The findings show that all planning documents deal with human health, but in different ways. All six Core Strategies/Local Plans mention health issues only implicitly, mainly in the context of climate change adaptation and mitigation as well as flood defense, thereby strongly targeting health protection. In contrast, all four GI Strategies explicitly name the improvement of health, due to the establishment or improvement of GI, as an objective, aim, or vision, and clearly refer to health promotion (e.g. encouraging active exercise in green spaces), while health protection plays a subordinated role in most cases. Nonetheless, both kinds of planning documents address physical activity by identifying the need for high-quality walking and cycling routes. However, differing reasons are given: Core Strategies/Local Plans mainly justify this on the basis of reduced vehicle emissions, improved safety of pedestrians and cyclists, as well as less congestion; whereas GI Strategies strongly promote access to the outdoors to encourage physical activity, leading to reduced obesity and respiratory diseases. Again, GI Strategies connect green structures and health more directly and explicitly.

⁴Core Strategies/Local Plans: Aylesbury Vale; South Kesteven; Bath & North East Somerset; Manchester; Lewisham; and Oxford. GI Strategies: Aylesbury Vale; South Kesteven; Bath & North East Somerset; and Manchester.

When investigating the chosen planning documents, implicit as well as explicit references to health aspects have been documented to ensure a thorough analysis. A keyword-search was conducted. To find explicit references to health issues, search terms like ‘health,’ ‘physical activity,’ etc. were used. Implicit references were documented when statements revealed links to health issues without explicitly naming them (e.g. recreation, air pollution control, groundwater purification, climate change adaptation, and mitigation, etc.). Finally, the documented statements were assigned to either health protection or health promotion.

⁵Note that ten planning documents only depict a small extract of the recent situation in the UK’s planning system where legislative requirements differ between the countries of England, Wales, Scotland and Northern Ireland. Therefore, a generalization on the entire UK situation is not possible. However, this analysis can be seen as a starting point for further investigation.

Two important requirements of health are recreation and food supply. Recreation is frequently mentioned in the two kinds of planning documents: Green spaces are recognised as recreational opportunities and thus their maintenance or improvement is generally seen as an important goal of planning in all of the ten analyzed documents, even though they are more often and more intensively mentioned in GI strategies. Most of the investigated GI documents draw an explicit connection between healthier lifestyles and the improvement of areas for recreation. The investigated Local Plans/Core Strategies (with a few exceptions) do not draw this connection but rather look at recreational areas from a planning point of view (e.g. maintenance and development of a network of recreational routes that provide easy access to countryside areas ensuring that the need for recreational areas of all residents is met).

Regarding food supply, half of the investigated documents – three Core Strategies/Local Plans and two GI Strategies – promote ‘grow your own’ schemes. These include community food groups as well as individual growing plots and allotments. It should be noted that the health benefits of growing one’s own food are not only from healthy nutrition but also arise from the physical outdoor activity (and potential social cohesion benefits) related to it. Van den Berg et al.’s (2010) study of 120 allotment holders and 60 non-gardeners in the Netherlands found that allotment gardeners are more physically active; 84% of allotment gardeners met the national recommendations for physical activity, compared to 62% of non-gardeners.

To sum up, as far as our selection of ten case studies allows, it can be said that the contribution of green spaces and elements to human health is already integrated into England’s planning approaches, but it is more explicit in the informal and voluntary GI documents. Core Strategies/Local Plans refer to health issues in an implicit way by dealing with topics such as climate change adaptation and mitigation, walking and cycling routes, recreation, or ‘grow your own’ schemes, without clearly mentioning the health effects of the respective aims and actions. Therefore, it can be assumed that the *status quo* in official planning documents is similar to Germany. Recently, Public Health England has issued guidance (2017) to try to link HIA to EIA, and to encourage public health teams to engage with the planning system in this regard. It recognises that, for major developments at least, the consideration of impacts needs to be multi-dimensional and consider health as well as the landscape and other environmental issues.

19.4 Ways to Include Health Issues in Planning Processes and Documents

Three options to promote human health in landscape planning have been identified by Rittel et al. (2016). Whilst mainly referring to urban landscape planning in Germany, they could also be transferred and applied to other planning instruments or systems. The three options differ in methodological intensity and breadth of scope:

1. Health as a factor to be assessed by Strategic Environmental Assessment
2. Health as an argument to further support ‘traditional’ landscape planning goals
3. Health as an independent topic in landscape planning.

1. Health as a factor to be assessed by Strategic Environmental Assessment

Integration of human health in a SEA (being a part of Sustainability Appraisal in England) is already legally required by the EU SEA Directive 2001/42/EC. The positive and negative health impacts of the proposed objectives and measures in a plan need to be thoroughly addressed. As a result, adverse health effects will be avoided and positive effects of (landscape) planning can be identified. These positive health effects of goals and measures, which are primarily aimed at landscape and biodiversity conservation, could be more explicitly named as they justify those goals and measures from a different, more anthropocentric, perspective. This could lead to a higher societal and political acceptance than pure ‘environmental conservation arguments’ might get. Nonetheless, this approach does not allow for proactively taking means to directly enhance the health benefits of green spaces.

2. Health as an argument to further support ‘traditional’ landscape planning goals

‘Traditional’ landscape planning in Germany aims at improving the state of the environment mainly in terms of biodiversity, but also in terms of landscape, soil, water, air and climate. Very often goals and measures identified for these purposes have positive side effects for human health, which are usually not explicitly mentioned in the plans. Hence, this option seeks to draw more attention to health effects by identifying and exposing them, and is therefore similar to the first option, but can also be used where no SEA is required. It is still the case, however, that no predominantly health-related objectives, goals, or measures are pursued with this option. Table 19.1 gives an overview of objectives often included in German landscape plans, and their potential health-related side effects. By naming these health effects, they could become effects pursued in landscape planning more consciously and proactively, rather than simply remaining unintended ‘side effects’ as at present. Methodologically, this option requires a survey and evaluation of health-related characteristics of specific green spaces as well as the likely health outcomes of implementing landscape planning objectives and measures. While the potential health benefits may be straightforward to identify based on current knowledge and evidence (e.g. WHO 2016), the scale and reach of the benefits may require more sophisticated tools than are conventionally available to planning officers.

Many planning documents encourage walking, cycling and the use of public transport. Here too, links to human health and well-being could be drawn, which not only result from minimised negative impacts of traffic (noise and air pollution), but also from enhanced physical fitness and mental health. As access to green spaces and their use is associated with a decrease in health risks such as high blood pressure and cholesterol, path and cycleways could be equipped with green structures or set up in green areas of the municipality.

Table 19.1 Examples of possible health-related effects of landscape planning objectives

Objectives of landscape planning	Health-related effects
Biological diversity	
Conservation of biological diversity	Species diversity (if not regarded as ‘wild’ or ‘unmanaged’) is often considered beautiful and can thereby contribute to relaxation and stress reduction, consequently enhancing well-being (e.g. via such mechanism as soft fascination, attention restoration, connecting self with nature, place identity) Depending on the type of urban green and its management, species diversity can reduce or increase vector-borne diseases (e.g. Lyme disease)
Water	
Protection of groundwater and surface waters from pollutants	Health protection by preventing the contamination of drinking water or natural bathing/swimming areas
Protection and development of water areas	Health protection and promotion by positive bioclimatic effects during the day (cooling)
	Health promotion and enhancement of well-being due to the attractiveness of water bodies and their suitability for recreational uses
	Promotion of mental well-being by positive effects on mental relaxation and stress reduction
Protection of groundwater resources	Health protection by ensuring an adequate drinking water supply
Climate/Air	
Protection of functions of green spaces regarding bioclimatic conditions and air quality	Health protection by the preservation and development of bioclimatic comfort islands and areas for production and transport of cool and fresh (cleaned) air
	Filtration of air-borne pollutants
	Health protection by implementing appropriate measures to reduce bioclimatic stress due to climate change
Soil	
Protection of the retention and water storing function of soils	Health protection by storing and evaporation of precipitation and flood water, reducing flood damage to homes and livelihoods
Protection of the filtering and buffering functions of soils	Health protection by avoiding contamination of soil and groundwater
	Health protection by remediation of contaminated sites and improved groundwater protection
Protection of the natural yield function	Health protection by ensuring the natural preconditions for food production
Protection of the archive function of geotopes	Health promotion by securing historically important geotopes which could contribute to recreation, a sense of place and regional identity

(continued)

Table 19.1 (continued)

Objectives of landscape planning	Health-related effects
Diversity, uniqueness and beauty of nature and landscape, open space recreation	
Protection of landscape and recreational functions	Health promotion and protection by preservation and development of natural, semi-natural and cultural characteristic landscape elements and green spaces, which contribute to the aesthetic attractiveness of a landscape and to local or regional identity
	Health promotion by prevention, reduction or elimination of factors impairing recreation
	Health promotion by preservation and development of various types of green spaces with potential for a diversity of different uses (physical exercise, social interaction, relaxation and restoration, nature experience, growing food, etc.)

Based upon Rittel et al. (2016, 77ff)

3. Health as an independent topic in landscape planning

Here, health related aspects are not just used to provide further support for ‘traditional’ landscape planning objectives. Instead, specific goals and measures are developed for the purposes of health protection, and health promotion. From a health promotion perspective, this is the preferred option, as it is the only one which allows for explicit pro-active measures promoting health, regardless of other landscape planning issues, such as biodiversity, water protection etc. This means, however, that landscape planning enters previously uncharted territory. Consequently, landscape planners require new knowledge, as they are usually not trained in health planning, and cooperation with health authorities. This is the most comprehensive and complex of the three options for including health concerns in landscape and green space planning, and requires the following working steps (Rittel et al. 2016, p. 41):

- Survey and assessment of the potential or actual health-promoting effects of green spaces
- Identifying and resolving conflicts between health-related requirements or aspirations and other landscape planning objectives
- Development of health-promoting measures in green spaces and the entire system of green spaces in a city
- Redesign of green spaces to improve their health-promoting potential and effects, if necessary
- Analysis of existing and potential user groups and others whose health might benefit: As health-related potentials and effects of green spaces heavily depend on user-specific requirements, an analysis of user groups is recommended. In every step of the planning process, it is useful to consider their needs and interests, as many health potentials of green spaces can only be realised if the spaces are actually used and/or considered as community places. Therefore, green

spaces must be adapted to the users' demands and stakeholder participation should play an important role in the planning processes (as, of course, should generally be the case, also regarding other planning issues besides health).

As the investigation of the ten English planning documents revealed, even explicit references to health issues are generally quite vague, e.g. 'GI promotes healthier lifestyles'. *How* this happens is often not explained, nor the means to plan green space to achieve this goal. To strengthen such kinds of statements it would be helpful to refer to scientific studies which give evidence of positive effects of urban green space on human health, and the likely magnitude of that effect. Examples of such studies include: Abraham et al. (2007), Bedimo-Rung et al. (2005), Bell et al. (2008), Fuller et al. (2007), Francis et al. (2012), Grahn and Stigsdotter (2010), Kaczynski et al. (2008), Lee and Maheswaran (2011), Mitchell and Popham (2007), Newton (2007), Pretty et al. (2010), Roe et al. (2013, 2016), Stigsdotter et al. (2010), Ward Thompson et al. (2012, 2016) and the Germany TEEB-study on urban areas (Naturkapital Deutschland – TEEB-DE 2016b) which gives an overview of the German context. A recent review of evidence on the many ways in which urban green space is linked to health can be seen in WHO 2016 and evidence on environmental interventions in green space to enhance health is summarised in Hunter et al. Chap. 17, this volume, and WHO (2017b). These and other similar publications can be helpful for landscape planners (in private offices as well as in public administration) as they offer sound evidence when it comes to decisions on conflicts or competition between different land uses, e.g. traffic, settlement and green space.

19.5 Health-Promoting Features of Green Spaces

The potential of green spaces to benefit human health, and their actual effects on health, depend on a variety of features and elements. These features and elements are presented in this section. For landscape planners, especially if pursuing the third option described in the last section, such features must be taken into consideration when assessing the health relevance of existing green spaces as well as designing new and redesigning existing ones. Unfortunately, to date it has not proved possible to attribute distinct health potentials and effects to certain, more generally defined, green space types, such as park, pocket-park, cemetery, garden, forest and so on, because in practice, these types are too heterogeneous in terms of size, location, vegetation, design, surrounding (infra-)structures or potential user groups, to allow for a similarly simplistic categorization of effect (Rittel et al. 2016, p. 50). Consequently, the consideration of each individual green space is required. However, it is not only the individual green space which should be considered, but also the entire open space system, or green infrastructure in a given area (municipality, city), as one green space rarely includes all desirable features and elements, but the entire system could or should do so. Sugiyama et al. (2010) make a good case for this in relation to physical activity, where size of park and the opportunities it offers for

walking may be more important than simple proximity. Ward Thompson (2013) considers ways that open space planning and design can support physical activity and Ward Thompson (2015) discusses links between landscape planning and design and human health more generally.

Features and elements of green spaces and the green space system should do justice to all of the four components (aesthetic-symbolic, social, mental and physical) relevant for human health. The following Sects. 20.5.1 and 20.5.2 show how this could be achieved. The sections mainly refer to Rittel et al. (2016), where a more comprehensive overview can be found.

19.5.1 Individual Green Spaces

Before considering specific health benefits that green spaces can offer, general quality criteria must almost always be fulfilled in order to ensure, at least in principle, that people may be willing and able to use a green space and therefore take advantage of its health potential. The criteria that support inclusive use include: safety issues (e.g. ensuring good visibility), cleanliness (e.g. provision and emptying of waste bins, lack of vandalism), appropriate equipment for different types of uses (e.g. benches, playgrounds, providing shade), sufficient pathways, accessibility and approachability (e.g. enough entrances, including step-free ones, consideration of potential obstacles such as busy roads).

Aesthetic-symbolic health potentials can be promoted by designing green spaces in a way which enables people to perceive a green space as attractive, ‘unique’ and to identify with it. This is closely related to its perceived beauty (evoked, e.g. by the play of light and shadow, water in various forms, sightlines, trees and different types of vegetation, attractive leaves and flowers) and to the emphasis or creation of features that reflect typical local characteristics. Of course, ‘beauty’ and ‘place identity’ are based on different individual and community values and experience, a fact reinforcing the importance of user analysis and/or stakeholder participation.

Social health can be promoted by allowing for interaction and integration, e.g. by areas usable for picnics, playing, growing food or organising community gatherings and events, etc., by separating areas for different, conflicting uses, and by use of barrier-free design, e.g. allowing access for wheelchairs and pushchairs and for people with mobility and sensory impairments. Enabling and fostering nature experience (e.g. by a variety of plant species also providing food for insects and birds, areas managed to promote wildlife and maintained less intensively; see Davies et al. Chap. 12, this volume), opportunities for gardening and self-harvesting, but also retreats which offer the possibility for quiet relaxation and restoration are important for mental health and stress-reduction (see Marselle et al. Chap. 9, this volume).

With regard to physical health, a range of options for play and sports should be provided, as well as for walking (by far the most common form of physical activity), although possible conflicts between nature conservation and health must be taken into account. This applies to allergenic plants (see Damialis et al. Chap 3, this vol-

ume), plants with thorns and toxic parts (especially near playgrounds for children), or meadows managed for wildlife, rather than closely mown lawns, which could increase the risk of tick infestation (WHO 2016; Müller et al. Chap. 4, this volume).

In conclusion, two points must be emphasised: Firstly, one single green space will not usually include all recommended features and elements, as this is unlikely to be possible in a limited space and as individual elements and uses can be in conflict with each other. Secondly, all points described in this section exclusively refer to health aspects, not to other requirements green spaces should fulfill, e.g. in terms of biodiversity and nature conservation or climate adaptation. Of course, in landscape planning these other demands have to be considered as well, and sound decisions have to be made in favour of one of them if conflicts cannot be avoided or minimised.

19.5.2 Green Space Systems

Especially in urban areas, it is not individual green spaces which determine the ‘green quality’ of a city, but the entire system of green spaces, which is unique to every city. Relevant questions for human health regarding this are as follows: How are different green spaces distributed within a city (and its surrounding regions)? Is there a spatial concentration of green spaces or are they evenly distributed across the city? How many inhabitants have easy access to these spaces and are they close to their homes? Do different green spaces offer possibilities for different uses and requirements, so that the whole green space system enables a good variety of uses and offers possibilities for many different user preferences? Are the green spaces interlinked (for example by smaller ‘greenways’) that allow for walking, hiking or cycling in a green environment for a longer distance? Only after these questions are answered, can the potential health effects of ‘local green’ be assessed for an entire municipality or city.

To ensure a minimum supply of public green spaces to their inhabitants, different cities have come up with standard values on recommended accessibility standards for green space per inhabitant. Some consider a minimum size of green space that should be available within a maximum distance from every inhabitant’s home, e.g. Natural England’s 2010 recommendation (by no means always met) of a minimum of 2 ha of green space within 300 m (5 minutes’ walk) of home. Others consider a minimum of green space per inhabitant. In Berlin, for example, 6 m² per inhabitant are considered necessary, even if this standard is not fulfilled in all parts of the city (Umweltatlas Berlin 2017). Beyond this, distinctions are made between different types of green spaces regarding their proximity to housing areas (Rittel et al. 2016, 56f; WHO 2016). Furthermore, the spatial network of all green spaces and greenways of a city is crucial. Beyond supporting walking or hiking during leisure time (e.g. ‘20 green main routes’ in Berlin, the Highline Park in New York), this should encourage daily physical activity as an integral part of people’s life, which is,

according to health scientists, one of the most important aspects of health promotion in settlement areas (Rittel et al. 2016, p. 59; Ward Thompson 2013). The journey to work, to school, going shopping, etc. should be covered as much as possible - not by car - but on foot or by bike. Special attention to this issue is paid in the next section.

19.6 Greenways for Sustainable and Healthy Mobility in Daily Life

To allow for daily active travel by people, attractive, safe and largely noise-free connectivity of routes in green spaces are an important precondition (Greenspace Scotland 2008). Accordingly 'green connections' for cyclists and pedestrians should be created between residential areas and highly frequented places such as community and shopping centres, schools, kindergartens and areas with a high density of work places. To implement such a network of greenways for everyday physical activity and mobility, pre-existing green spaces could build the backbone, supplemented by newly planned routes, but especially by linear green structures, such as clearly demarcated pedestrian and cycle paths safe from motorised traffic and accompanied by tree avenues, hedgerows and other appropriate linear green elements. An overlap with parts of a habitat network or land within a green belt is possible, but conflicts should be avoided or at least minimised. Seen from a landscape planning perspective, this would ideally result in a city-wide network of green infrastructure, consisting of multi-functional green spaces with high amenity values and linear, but 'green', path connections. Such a network could contribute to the reduction of car traffic, thereby reducing noise, accidents and air pollution, and in this way would also improve healthy environmental conditions.

How such an approach could be pursued in (landscape) planning has been shown by Bloß (2016) in the example of the city of Oranienburg, a medium-sized municipality with about 42.000 inhabitants, located ca. 20 km north of Berlin. In order to identify suitable routes in an area of limited available space, Bloß made use of the GIS-based least-cost path (LCP) model (see Conine et al. 2004; Teng et al. 2011) for greenway alignment purposes. The LCP combines a land suitability assessment with an algorithm in order to identify the most suitable routes. Simplifying the working procedure somewhat, the following main steps were taken:

1. Identification of demand areas. Residential areas and highly frequented urban centres were identified as areas with a high demand for interconnection by greenways. These 'demand areas' were used to determine start and destination points for greenways (see Fig. 19.1).
2. Suitability assessment. The suitability of different areas for being a part of the greenway network was assessed using five criteria: land availability, road types, attractiveness, demand for connectivity and protection status (nature conservation). For each of these, all spatial features were categorised into levels of suit-

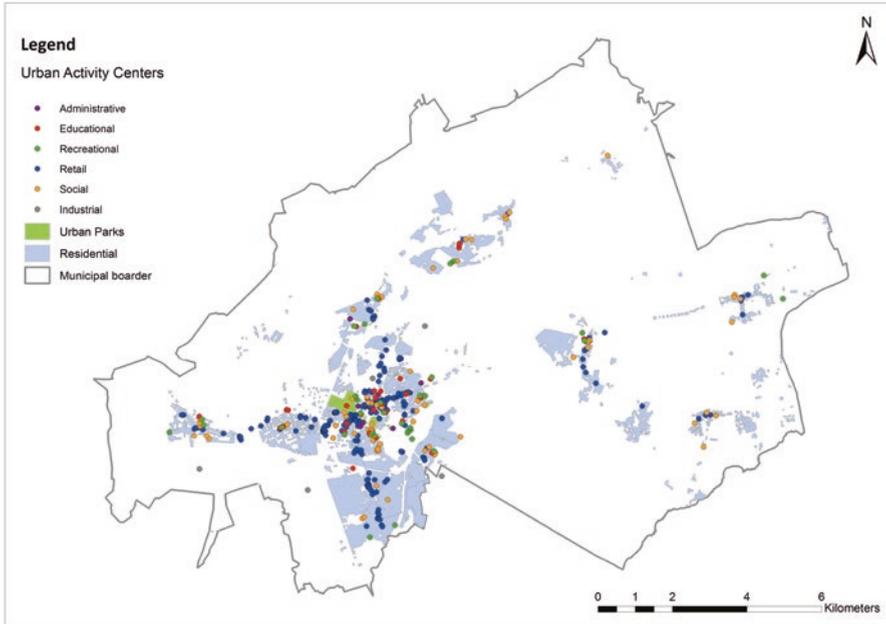


Fig. 19.1 Demand areas: residential areas and urban activity centres in Oranienburg that are to be connected by greenways (Bloß 2016, p. 33)

ability in single maps (see Fig. 19.2, example ‘protection status’). After that, the criteria were weighted by their relative importance for greenway implementation and an overall suitability map was created.

3. Delineating the most suitable routes. The suitability assessment was the basis upon which the LCP algorithm was used to delineate the most suitable routes between the demand areas. The results of a first run of the model was discussed with local planning officials to evaluate its validity within the Oranienburg context. The discussion showed some deficits in the results and led to a modified second model run, leading to an adjusted greenway network (see Figs. 19.3 and 19.4 for the results of both model runs).

The resulting greenway network fulfilled the intended functions of alternative travel provision and nature protection to a large extent. However, although some constraints of the first network (e.g. physical barriers not considered by the model) could be eliminated by the second one, this still includes some undesirable trade-offs, such as route alignment along main roads. Besides reflecting some imperfect weight allocations within the model, this is mainly a consequence of the scarcity of suitable sites which limited routing options – certainly not only a problem in Oranienburg, but found in most cities. This can be regarded as a major challenge and a problem to be overcome by landscape planners on the one hand, and as a fact which should lead to realistic expectations and compromises on the other hand.

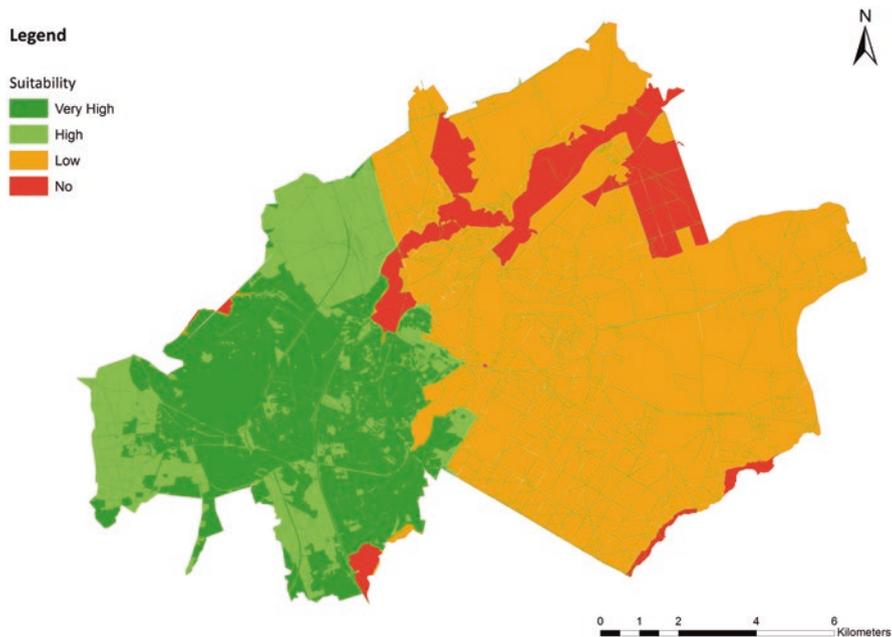


Fig. 19.2 Suitability of areas for the greenway network according to their nature conservation protection status (Bloß 2016, p. 37)

Even if no ‘ideal’ green network can be achieved, the example shows that good results are possible. Therefore, an approach as pursued by Bloß (2016) could be integrated into landscape planning, by adapting the method as well as the criteria for the suitability assessment to the respective local conditions and requirements.

19.7 Conclusions and Outlook

This chapter has shown that health issues are already implicitly touched upon or, in rare cases, explicitly named in landscape planning in England and Germany. In general, the potentials for including health issues into landscape planning are used neither frequently nor extensively, even if mutual benefits for health protection and promotion on the one hand and nature conservation and green space development on the other can be expected. One likely reason for this deficit is that to overcome it would require additional efforts by landscape planners and the respective planning and development authorities as well as by health authorities. There are some examples of recent attempts to overcome these disciplinary and professional silos, such as the 2015 development of the Place Standard Tool (NHS Health Scotland 2017), jointly promoted by the Scottish Government, the National Health Service, Scotland, and Architecture and Design Scotland – the Government body responsible for

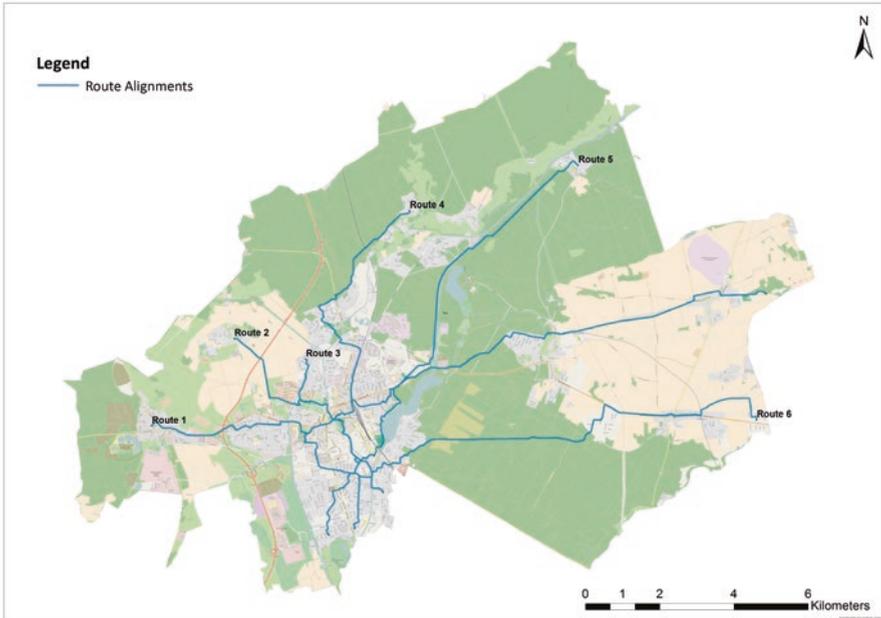


Fig. 19.3 Results for the first run of the Least-Cost Path model for the greenway network (Bloß 2016, p. 39)

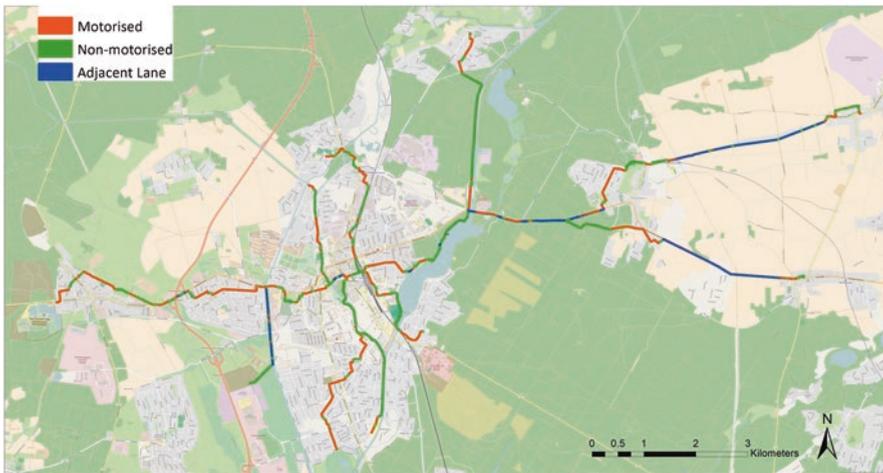


Fig. 19.4 Results for the second run of the Least-Cost Path model for the greenway network (adjusted model) showing sections of the network which are currently motorised, non-motorised or adjacent lanes to motorised roads (Bloß 2016, p. 48)

promoting policy on architecture and ‘place’. The intersectoral public health action plan (Fachplan Gesundheit), promoted by the North Rhine-Westphalia Centre for Health since 2009, is intended for use by the public health sector in optimizing participation in the municipal policy and planning cycle (Claßen and Mekel 2017). Additionally, the ‘Leitfaden Gesunde Stadt’, an adopted version of the Healthy Urban Development Checklist of New South Wales (NSW 2009), has been published for use by local and regional public health and planning authorities (Landeszentrum Gesundheit NRW 2016). However, the results of the implementation of such guidelines and policies, and the linking of EIA and HIA in England, remain to be seen. In the absence of such evidence, we argue for the importance of these efforts because, if landscape planning is to have a socially acknowledged role in the face of rapidly changing natural, technological and political conditions and global grand challenges such as climate change, urbanization, health inequity and an ageing population, it must tackle key societal problems. This position is supported by a variety of publications by governmental bodies, scientists and NGOs. It remains to be seen if and how they will affect landscape planning in the mid- and long-term perspective.

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