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USING THE PLANNING SYSTEM TO SECURE HEALTH AND WELL-BEING BENEFITS

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Summary

The places we live shape our health, our life chances and a wide range of other social and economic opportunities. Therefore, the way we manage our built environment using the planning system can play a major - but often unseen - role in peoples' lives by creating (or constraining) a wide range of opportunities to influence health, well-being, poverty and inequality. Although the Northern Ireland planning system has the potential to exert a strong positive influence over such issues, this role is current neglected due to an ambiguity over its core aims and the fact that it is now primarily seen as a bureaucratic instrument coordinating and facilitating development, focussed on delivering opportunities for economic growth. By exerting its powerful influence on health by increasing access to local services, work and housing while enforcing environmental and housing standards, the planning system can improve air quality, levels of physical activity, mental health and opportunities for healthy diets. In the context of major reform of the Northern Ireland planning system, this session explores how it can be used to enhance health and well-being outcomes and contribute more broadly to securing the social benefits by focussing on nine key actions to promote Healthy Urban Planning.

1. Health, well-being and the built environment

The places we live shape our health, our life chances and a wide range of other social and economic opportunities. Therefore, the way in which we build and manage towns and cities can play a very influential role in our well-being and quality of life. The majority of the world's urban dwellers live in poor conditions in the Global South where the basic provision of water, sanitation and housing can transform the life chances of billions of people. As important as this challenge is, over the last 20 years there has been a growing recognition that the built environment is also having significant impacts on the relative health of those living in more prosperous regions of the world. Here the main health challenges do not originate from poor water supply and overcrowding, but from chronic, non-communicable diseases (NCDs[i]), which have become the leading cause of death in the world[1]. This may mean that, for the first time in modern history, children may have a lower life expectancy than their parents[2]. NCDs are increasingly being linked with environmental factors and lifestyle issues, which themselves are strongly influenced by urban form and access to local services. Examples include increasing obesity rates and the impact of more sedentary lives; the health consequences of air pollution and access to healthy and fresh food. Given that these issues tend to be most acute in Northern Ireland's most deprived communities, they are also closely linked to sharp inequalities in health. These major public health challenges have reignited an interest in the enormous value derived from progressive approaches to planning and rejuvenated the interest in town planning as a movement for social reform.

The core response to the challenge of these NCDs is not just about improved access to healthcare services, but by embedding the notion of health into the most basic decisions about how we organise our towns and cities and the values we choose to prioritise when investing in infrastructure, transport and the way we organise our economy. For the purposes of this paper, we take the definition of health from the World Health Organisation who define it as being '*a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*'[3], a definition closely linked to the more intangible concept of *well-being*. Although subject to much debate over precise definitions[4], a concise way to think about well-being has been suggested by the New Economic Foundation who suggest it has two elements: 'feeling good and functioning well'[5], which goes beyond just being 'healthy' but reflects issues such as 'feelings of happiness, contentment, enjoyment, curiosity, engagement' and 'experiencing positive relationships, having some control over one's life and having a sense of purpose[v]. The aspiration of improving well-being has been recognised in recent legislation for planning in Northern Ireland (see below) and is implicit in the outcomes framework adopted by in the current Draft Programme for Government[6]. Indeed, there are already many good examples in Northern Ireland of proactive initiatives that reflect the well-being approaches of Healthy Urban Planning, including a new regional cycling strategy[7], the activities of Belfast Healthy Cities[8], projects such as the Connswater Community Greenway[9] and many more[10]. Healthy approaches to urban planning can give rise to substantial economic[11], social and environmental benefits, while most healthy urban planning initiatives also tend to tackle other chronic problems such as climate change, car dependency, local economic problems and social cohesion. In recognising these broad, long terms benefits in March 2016 NHS England announced that it was promoting ten new demonstration projects to show how we can build Healthy New Towns [12].

In this context it is therefore surprising that a healthy approach to planning has not been more fully embraced by the planning system in Northern Ireland. In order to understand why, we can briefly consider the way in which the planning system has evolved in these regions over the last fifty years.

2. Health as an aim of the planning system

It is generally known that our contemporary planning system has evolved from the 19th Century when rapid urbanisation gave rise to overcrowding, poor sanitation and unregulated building and prompted epidemics of diseaese such as typhoid, cholera and scrofula. This necessitated the imposition of simple planning rules (including space standards, provision of open space, control of air pollution and robust sewerage systems), which transformed UK cities and undoubtedly saved the lives of millions of people. However, it is less well appreciated that the early protagonists of planning were not just focussed on the technical engineering of infrastructure, but were enthused by broader progressive ideas of social reform[13]. It was these inspiring visions of how to better build our cities and societies that enabled the benefits of planning to become so wide spread, in much the same way as we now need a new vision of future urban living.

The planning system evolved drastically through the 19th and 20th Centuries, culminating in the 1947 Town and Country Planning Act (England and Wales, and with later variants in Scotland and Northern Ireland). This established the need for planning permission, so that there could be a collective and democratic consideration of whether any new development aligns with the public interest. This core planning mechanism (which still exists) was also accompanied by a wider measures,

[i] The four main types here are cardiovascular disease, chronic respiratory disease, diabetes and cancer.


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including the development of New Towns (Stevenage, Milton Keynes, Craigavon), and powers to ensure that a proportion of land value created through planning could be reinvested to meet community needs. At that time the planning system was also used to redevelop slum clearance, leading to an unprecedented improvement in living standards and housing quality. This was echoed in the 1945 *Planning Proposals for the Belfast Area* emphasised three key issues: agriculture, industry and '*the health and convenience of the people'.* The creation of the planning system is a vastly underestimated progressive initiative, which saw the management of where we live as a core element of the post war welfare state, alongside the National Health Service.

Despite these progressive origins, the social value of planning has slowly ebbed away over recent decades as market-led, neo-liberalist approaches to urban and economic development have come to the fore[14] accompanied by less emphasis on health, quality of life and tangible outcomes for local communities. This has been accompanied a growing dominance of technical professionalism[15] within planning and with it, a focus on the technicalities of process rather than the outcomes that can make real and direct differences to people's lives[16]. This criticism of planning is clear if we consider the key statutory definition of planning's purpose in Northern Ireland legislation, which emphasises duties of the planning system '*to secure the orderly and consistent development of land'*[17], but says little of the what citizens can expect the planning system to deliver for their neighbourhoods. Indeed, research from 2011[18] suggested that most people in Northern Ireland felt that planning decisions did not adequately reflect the public interest and that a continual reform of planning has failed to address the issues that were of most concern to the public. However, the most recent planning legislation for Northern Ireland has added an additional duty that planning functions must be undertaken 'with the objective of furthering sustainable development and promoting or improving well-being'[19]. This suggests that the benefits of healthy urban planning is beginning to be recognised in Northern Ireland, a view that is reinforced when we consider the recently published *Strategic Planning Policy Statement*[20] in which 'health' or 'healthy' is mentioned 27 times and 'well-being' 34 times. However, wellbeing is almost exclusively linked to arguments for economic growth, without really appreciating that the very type of development that prioritises growth, also tends to erode the very basis of healthy urban development. In order to consider this further, we need to consider the range of ways in which the places where we live can influence health and well-being.

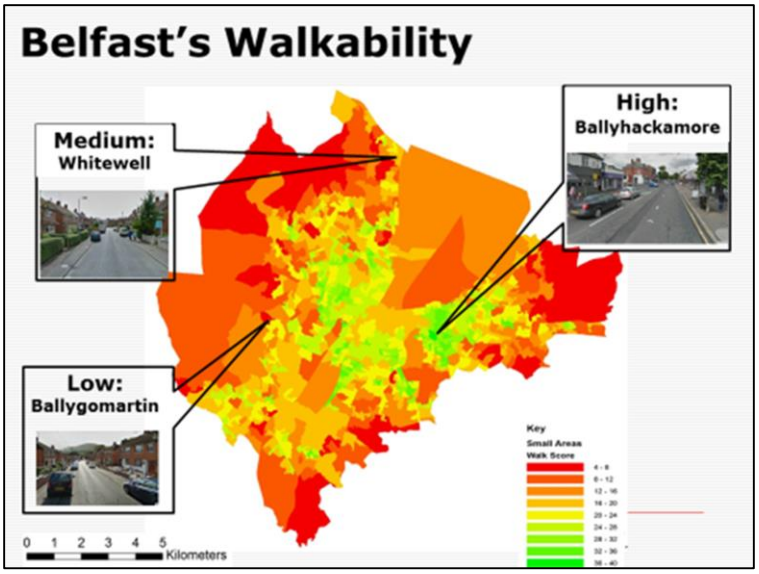
3. Health and the built environment

Traditionally the relationships between health and the built environment have been considered primarily in terms of the avoidance of infectious diseases, toxic substances and physical danger, or merely the location of healthcare services. While such issues continue to be important, over the last twenty years we have begun to develop a more nuanced understanding of the way in which health can be compromised or supported by the built environment. This view sees good health not only being determined by genetic and lifestyle factors, but also a wider range of social, economic and physical determinants shaped by the communities in which we live[21], particularly for children[22] or older adults[23]. The links between health and the home environment also gives rise to a wide range of inequalities[24]. The conditions of the homes we live in is clearly crucial to our health, but the wider neighbourhood features also exert important influences, for example:

- **Air Quality**. Increasing levels of air pollution has been linked to cancer, asthma, stroke, heart disease, diabetes, obesity, and dementia[25]. A recent report from the Royal College of Physicians[26] estimated that around 40,000 UK deaths are attributable to exposure to outdoor air pollution each year (1,920 pro rata in Northern Ireland) and cost the UK more than £20 billion every year due to the impacts on our personal lives, health services and business. The large majority of this pollution comes from diesel cars resulting in poor air quality along major road corridors and is particularly acute in the inner areas of cities, where traditionally communities have lower car ownership and suffer from other forms of environmental and social injustice.

- **Obesity and sedentary lifestyles**. 24% of men and 21% of women in Northern Ireland are obese[27]. Obesity is linked to a range of major health issues including diabetes, heart disease, cancer, arthritis and depression and estimated to cost Northern Ireland £370 million per year[28]. Physical inactivity, irrespective of whether someone is overweight or not is also seen to be a major contributor of ill health[29] and physical activity has been described by a former Chief Medical

Officer of England[30] as 'a miracle cure' for its impact on a wide range of NCDs. In Northern Ireland 65% of adults do not achieve the recommended levels of physical exercise[31]. The causes of inactivity and obesity are complex but strongly influenced by environmental factors related to the availability of certain types of food and the physical form of the built environment[32]. Research has found associations between levels of physical activity and body mass index with urban features such as residential density, land use mix, proximity to parks and provision of local services[33]. There is also emerging evidence that different features of rural settlement also influence physical activity[34]. Built environment features that promote walking and cycling can produce a wide range of co-benefits such as helping to address climate change, air and noise pollution, car accidents and congestion while increasing social interaction. Despite this, cities throughout the world continue to build low-density communities with poor access to shops, services, and public transport[35], as we do in Northern Ireland. It is possible to produce an indicator of how conducive built environments are for walking by producing a 'Walkability Index' that measures the key features that increase such activity (connectivity, land use mix etc) and Figure 1 shows this for Belfast. It is noticeable here that the parts of the city that have been constructed or reconstructed in the post war era have the lowest levels of walkability.



Source: Ellis et al, KESUE project: http://bit.ly/1EV9PQX

- **Access to open and green space**. Irrespective of the wider qualities of the built environment it has been found that proximity to urban greenspace is related to increased physical activity, lower body mass index and other obesity related health indicators[36]. Parks and greenspace are also positively associated with a range of other health benefits that include greater social cohesion due to the opportunities from group activities, higher levels of mental well-being and tranquillity from associations with nature[37]. The presence of trees has also been shown to help reduce smog formation and have a positive influence on rates of asthma, skin cancer and stress-related illness.

- **Social exclusion and poverty:** There is a distinct social gradient related to health – the lower a person's social position, the worse their health[38]. Such inequalities are driven by a range of factors, but have strong spatial associations and can be linked to environmental features, so that that it is possible to identify the most acute pockets of deprivation for targeted built environment interventions. Planning can exert a strong influence on issues related to social exclusion[39], including enhancing community engagement in deprived areas, increasing local connections between employment centres and residential areas, ensuring local people can secure access to new training or employment opportunities, securing wider social benefits through planning gain and addressing imbalances in environmental quality through the adoption of minimal standards. However, planning all too often fails to recognise the distributional outcomes of development for those most in need, thus compounding health challenges of deprived areas.

- **Mental health**. It has been clear that the physical environment is closely associated with mental health and wider feelings of well-being, with aspects such as poor housing, neighbourhood noise, poor levels of daylights, pollution, fear of crime, overcrowding and a lack of 'escape facilities' such as green spaces and community facilities being all linked to poor mental health and psychological distress [40], [41] .

- **Access to healthcare and other services**: Access to local community facilities and services can also influence health in a range of ways – for example availability of recreational facilities appears to be positively linked to higher levels of physical activity[42], obesity has been linked to the availability of different food stores[43] and an ability to walk to schools, doctors and other facilities increases opportunities for active travel. An evocative way of testing whether a neighbourhood is safe, accessible and supports social engagement is to apply 'The Popsicle Test'[44] (or perhaps a Northern Ireland version, 'The Poke Principle'), where a child can safely walk alone to a shop, buy an ice lolly (or poke)

and get home before it melts. Very few neighbourhoods in Northern Ireland would meet this simple test – indeed, recent research[45] has shown that only 60% of people in Northern Ireland live within walking distance of retail or commercial services, and walking behaviour falls away as distance from these services increases[46].

This is certainly not an exclusive list of the health impacts stemming from the built environment, but does indicate the complex ways in which people's well-being can be severely compromised by the neighbourhoods they live in, and the way in which these issues are not fully understood and addressed by conventional approaches to planning. While space limits a more detailed explanation of such issues here, it also points to the potential ways in which the planning system could be used to proactively support the health of people in Northern Ireland.

4. What role do planners have to improve health and well-being?

There is therefore strong evidence that built environment interventions that help support people's long term health can result in a range of self-reinforcing social, economic, and environmental benefits. Furthermore, such initiatives tend to have greater efficacy as built environments are used by *all* sections of society, have very long lasting impacts and in many cases can require no additional resource at the time of implementation. Although a holistic approach to healthy cities requires the attention of a wide range of government and non-government actors (including transport providers, public health agencies, private sector developers etc), planning authorities are well positioned to take on a central role, because:

- The requirement for planning permission allow planners to exert a *comprehensive* check that all proposed development aligns with the public interest, in which health can be given a high priority (see below);
- Good planning takes a long term perspective, in which health benefits can accrue to overcome short-term economic advantages;
- Planning has always sought to incorporate a diversity of interests and balance a mix of social, economic and environmental objectives to manage complex issues;
- It is democratically controlled with a strong ethos of public participation at its heart;
- Although the broader value of progressive planning is under-appreciated, there is a broad acceptance that planning itself is an essential component of a civilised society.

5. Nine key actions for Healthy Urban Planning in Northern Ireland

In acknowledging that there is some positive action being taken by a range of organisations to promote healthy urban planning in Northern Ireland, there is much greater potential for the planning system to directly promote health and well-being when compared to good practice in other places. Although not comprehensive, nine key actions for realising a healthy urban planning are briefly discussed below:

- ***Make good health the statutory objective of the planning system***

  As noted in section 2 above, the legal purpose of the Northern Ireland planning has been defined in relation to land, rather than outcomes for the region's citizens. This has created ambiguity in what the planning system should deliver and contributed to the failure to tackle major long term challenges such as sustainability, shared space and social cohesion. While well-being has been added to the duties of the central planning authority in Northern Ireland, this is still secondary to the purpose merely to secure 'orderly and consistent development' and crucially adopts the less tangible term 'well-being', rather than health. There is no detailed guidance on how well-being should be defined in relation to the Northern Ireland Planning system and as a result of this lack of clarity there is little evidence on it having any significant leverage in planning policy and decisions. However, a simple amendment of Section 1(1) of the 2011 NI Planning Act[ii], could have major implications for how the planning system supports long-term health, and bring with it major economic, social and environmental benefits. This would also align the planning system with the approach taken in the current Draft Programme for Government[47]. Such an objective would create a unifying vision of what the planning system is for, provide the legal support for health to become a key consideration in planning decisions (see below) and encourage a 're-tuning' of key planning principles (e.g. transport, access, density etc.) towards better health outcomes.

- ***Adopt a health-led planning system***

[ii] For example, replacing the current s1(1) (*'The Department must formulate and co-ordinate policy for securing the orderly and consistent development of land and the planning of that development'*) with *'The Department must formulate and co-ordinate planning policy for securing the development of land that secures improved health and well-being for current and future generations'*.

Although it is important that that the planning system has health as part of its overall vision and purpose, there are also a range of other lower level actions that can be introduced to ensure that the decisions that shape our built environment are made to support our health. This includes the need to include health goals in local development plans and to ensure that planners recognise the relevance of their actions to future health. This can be achieved by adopting measures such as: ensuring health and prevention of pollution become 'material considerations'[iii] in planning; incorporating public health experts into frontline planning teams; routinely adopting Health Impact Assessments[48]; and provide councillors and planners with training in the opportunities created by healthy urban planning. This can also be promoted by guidance on specific aspects of the planning system, such as new guidance on minimal standards for greenspace provision, access to local services or infrastructure that supports active travel (see below). This could also include better regulation of those aspects of land use that encourage poor health behaviours, such as restricting the location of fast food (especially around schools) or alcohol outlets, as many other places have begun to do[49]. Government commitments to healthy urban planning can also be demonstrated through support for high profile projects – such as further greenway projects or a Northern Ireland version of the NHS Healthy New Towns programme[50].

- ***Get serious about car dependency***

  High levels of car dependency are related to a complex, self-reinforcing cycle of social, environmental and economic problems, not least the health challenges related to community severance by traffic, physical inactivity and air pollution[51]. This is a central issue for healthy cities and towns. Northern Ireland has some of the highest rates of commuting by car (81% compared to 68% in the rest of the UK). Indeed, the average person in Northern Ireland makes 30% of their journeys that are less than one mile in a car; 68% of journeys between one and two miles by car; and 85% of journeys from 2 to 5 miles by car. These are all possible by walking and cycling for most people. This has a range of health consequences linked to problems of physical inactivity, air pollution, increased accident risk and imposing limitation on child freedom. The causes of car dependency have deep cultural, financial and geographical influences, but long term choices over how we build our settlements and how we invest in public infrastructure can have a major impact on modal shift. However, despite over 15 years of policy[52], [53] to reduce car use in Northern Ireland, it continues to increase. Indeed, many of the key stimulants of car use, including low residential density, out of town shopping and employment, low coverage of public transport services and increase road capacity continue to be encouraged by the Northern Ireland planning system. It continues to be identified as one of the most car dependent and congested cities in Europe[54], with severe health and economic consequences. This suggests that there should be a far more concerted action on car dependency through the coordination of planning and transport policy. This should include positive measures for reducing the demand for car travel through the enhancement of public transport, strategies for making walking and cycling easier (see below) and by limiting developments that encourage car use, such as those on greenfield sites. This will also have to involve overt policies to discourage car use, including: a gradual reduction of car parking spaces in town and cities (such as an annual 1-2% reduction over 20 years or so); consideration of a Belfast congestion zone; introduction of additional 'road diet[55]' measures such as parklets, segregated cycle lanes and pedestrianisation; and a more extensive use of the HEAT tool[56] for assessing transport projects.

- ***Make Active Travel Easy***

  While many of the issues addressed above relate to curbing car use, key health benefits can also be derived from directly encouraging active forms of travel; walking and cycling. Increased use of public transport should be seen as supportive of active travel as this not only improves the urban environment by reducing car use, but also for most users, results in increased walking at either end of the journey. Key components of an active travel strategy should include measures to make walking and cycling safer, such as expanding the coverage of 20mph speed limits from Belfast City Centre to residential areas and further expansion of the segregated cycle network, as indicated in the Northern Ireland Bicycle Strategy[57]. Despite these positive developments, transport spending in Northern Ireland continues to be used to support the existing modal split with the DRD's 2013-14 budget indicating a 85% spend on roads[58], and in 2015 £4.17 per person was spent on cycling (up from 54p in 2014). This is contrast to recent experience in many of the world's leading cities, who have recognised the long term economic benefits of investing in cycling infrastructure – for example London has a strategy to spend £145m a year on cycling (£18 per person) and the Government in England has made a legal commitment to a long term investment strategy for walking and cycling[59]. Despite this, research has indicated the

[iii] Material considerations are the scope of issues that are those that are relevant to making specific planning decisions. They are defined by legislation, policy and the case law. None of the examples of provided on the Northern Ireland Planning Portal relate to health, well-being or any overt social outcome.

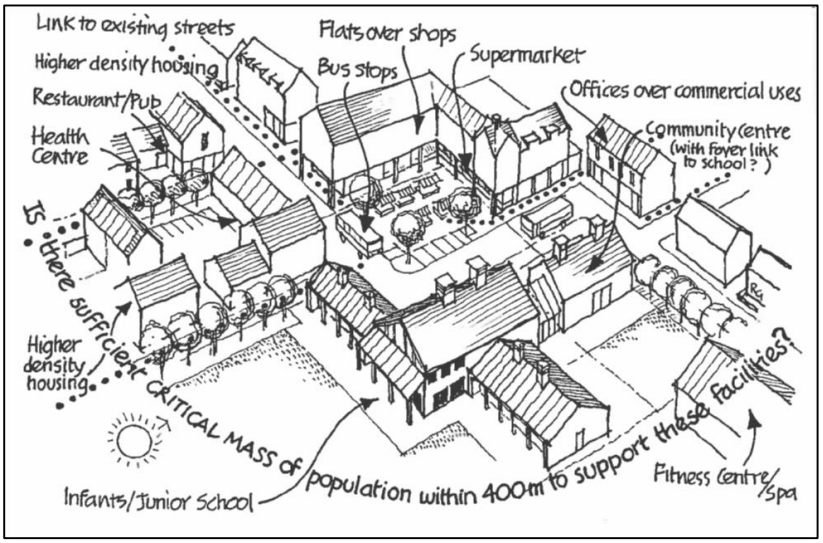
very positive economic impact generated by investment in walking and cycling – for example it has been suggested the cost of the Connswater Community Greenway (£40m) could be recouped if only 2% of the current inactive population of East Belfast achieve recommended levels of physical activity as a result of the scheme[60].

Increasing walking and cycling is however not just about adjusting transport budgets and implementing specific infrastructure schemes, but also about adopting more general approaches to planning that over time increase the walkability of our towns and cities. This can include increasing urban densities and the connectivity of neighbourhoods, ensuring greater levels of land use mix and access to local services, which can arise from a neighbourhood planning approach (see below).

- ***Rediscover planning at the neighbourhood level***

The neighbourhood is the core building block of healthy urban planning as this scale tends to be small enough to facilitate walking to most local services and reflects most people's social networks, yet large enough to support key economic functions and environmental services. While the most suitable size of a neighbourhood will depend on local densities, urban form and community composition, in general these refer to areas within around 10 minutes of a local centre, or the size of a small village. At this scale, with adequate densities, it is possible to provide a wide range of local services within walking distance and support public transport to nearby larger centres. For example, Barton et al (2010)[61] note that a neighbourhood centres can walkable access to clustered local services, food outlets, schools and clinics, while providing local employment opportunities, social engagement and adequate opens space. This also offers opportunities to effectively organise access to public services – including healthcare hubs and neighbourhood planning offices that can share facilities and support better community engagement (see below). At 60 persons per hectare it is possible to develop communities of around 6000 people that can support a wide range of these local services and where 70% of all journeys ca be undertaken by walking, substantially enhancing the health of the local population.

Key features of a neighbourhood centre level (from Barton et al 2010)



Examples of accessibility criteria at the neighbourhood level (from Barton et al

Toddler's play areas	100m
Allotments	200m
Playground	300m
Bus stop	400m
Local shops, pub, community centre	600m
Primary School	800m
Surgery	800m
Playing fields	1000m
Secondary School	1500m
Leisure Centre	1500m

- ***Integrate environmental health with planning***

The planning system is the first line of defence against polluting activities. The fact that all development is controlled by the planning system means that it should be possible to identify local environmental thresholds for developments that contribute to poor air quality (including traffic), or prevent unauthorised development that can have very major local environmental impacts such as the illegal dumping of waste[62], This not only requires an effective system of planning enforcement[63], but relies on greater integration of the process of environmental regulation, environmental health and land use planning, which has now been made easier in Northern Ireland following the consolidation of many of these responsibilities at the local authority level. This includes a more proactive deployment of Strategic Environmental Assessment and Environmental Impact Assessment, which are mandatory in specific circumstances under European law, but which tend to be applied in a formalistic way that leaves them acting more of a 'burdensome charade'[64] than being positive and valuable influences on mediating the worst environmental effects of development. Local authorities need to be empowered to better assess and regulate according

to local and global environmental capacities, reflect these in local development plans[iv] and help provide them with the evidence they need to be able to refuse planning permission for developments that may further compromise local environmental quality, or offer risks to key local environmental assets, such as the water supply.

- ***Make places greener***

  The benefits of being able to access greenspace is noted in section 3. Such open space is distributed unevenly across our towns and cities, and even an issue in rural areas where the lack of access to open land suggests that living in agricultural areas acts as a disincentive to walking[65]. Long term greenspace provision can be supported through the establishment of minimum criteria to open space for new developments, which could include the adoption of the long standing 'Six Acre Standard' proposed by the National Planning Fields Association that specifies that six acres (2.4 ha) of open space should be provided for every 1000 people in a local area. There are currently major inequalities in greenspace provision – for example 20% of the highest incomes neighbourhoods in England have five times the amount of greenspace than the most deprived 10%[66], so the adoption of minimal access distances from homes can help ensure that adequate open space is included in future development, including a toddlers play area (100m), a playground (300m), a local park (300m), playing fields (1000m) and a major greenspace (2000m)[67].

- ***Address health and environmental inequalities***:

  As noted above, the environments in which we live have a direct impact on health and the great variation in the quality of physical and social environments contributes to the substantial health inequalities noted in section 1, as highlighted by the Marmot Review (2010). This reflects deep social divisions in UK society that can only be addressed by major policy reform in welfare, employment and education policy, as well as pursuing the Health in All Policies approach (HiAP)[68]. Notwithstanding the need for substantial action in these areas, inequalities in health can also be tackled through planning by a focus on addressing the inequalities that exist in: quality and access of housing; transport; healthy food, access to greenspace and the quality of the social environment. The emphasis on Age -Friendly[69] and Child-Friendly[70] Cities can also help identify how inequalities amongst different demographic groups are reflected in their access to, and experience of, the built environment. Therefore, if planning approaches are to have the greatest impact, and to maximise cost-effectiveness, they need to be explicitly redistributive and target the areas of most need, in much the same way as the early planning pioneers were committed to wider social reform. Here, the adoption and enforcement of minimum standards in local development plans of related to thresholds for access to local services, community facilities, greenspace, public transport can ensure that development helps target the needs of the most vulnerable to health inequalities.

- ***Effective community engagement***

  Finally, it needs to be highlighted that central to any robust planning process is an effective process of community engagement. There is a plethora of advice on this so it does not need to be expanded here[71], but core requirements include a genuine commitment to participation from planning authorities, the development of long term relationship between communities and state institutions and need for participation strategies to be carefully initiated, well-resourced, designed for purpose and subject to ongoing evaluation[72].

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[1] http://www.who.int/features/factfiles/noncommunicable_diseases/en/ Last accessed 07/06/2016.

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[iv]For example, the Royal Commission on Environmental Pollution (2002) called for spatial plans to become 'four dimensional, covering not only traditional land use matters, but also the atmosphere and groundwater'.

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[8] See the planning resources from Belfast Healthy Cities at http://planning.belfasthealthycities.com/ .
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[10] For example see the examples given in Sustainable NI (2015) *Places for People – a sustainable planning guide for councillors* http://www.nilga.org/getattachment/45159cbb-0d27-4a10-b08c-dff322fc0bcf/Sustainable-NI---Places-for-People-%E2%80%93-a-sustainable.aspx Accessed 29/05/16.
[11] Such as less time off due to sickness, lower welfare payments and a reduced burden on the NHS.
[12] Healthy New Towns https://www.england.nhs.uk/ourwork/innovation/healthy-new-towns/ Accessed 11/06/16.
[13] Leading thinkers here were Ebenezer Howard (Welwyn Garden City), Titus Salt (Saltaire), Robert Owen (New Lanark) and in Northern Ireland John Grubb Richardson (Bessbrook).
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