Developing an accessibility appraisal model for the external environments of housing estates

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Keywords

Housing, Disabled people, Appraisal

Abstract

Based on research carried out on a mature estate in South Belfast, Northern Ireland, this paper investigates the obstacles to accessibility in order to produce an appraisal model for external accessibility. The study included a review of best practice, a preliminary access appraisal and resident and service provider consultation. Residents were surveyed on a number of issues including location, roads and pavements, transportation, level change, wayfinding, safety and security, and public areas. It was discovered that obstacles relating to wayfinding and traffic management created the greatest problems for residents. The resultant model will enable housing providers and managers to identify specific areas of inaccessibility and the feasibility of improving them as well as allowing comparisons between estates. It is intended to provide all agencies involved in housing with a basis for collaboration in the enhancement of accessibility.

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Introduction

It is now widely accepted that buildings and external environments should be healthy, safe and user-friendly, and flexible enough to accommodate a range of needs (Pickles, 1998). However, it is only recently that the needs of the real people who use the built environment have begun to be considered by designers (Russell, 1999). In light of the ageing population (over the next 40 years the proportion of older people in the UK will increase from one in six to one in four of the total population (Russell, 1999)), and the increasing life expectancy of many people with disabilities, it is becoming increasingly important that designers and property managers consider the accessibility of existing buildings and environments.

The issue of accessibility is becoming increasingly important for the providers and managers of social housing. This is underlined by the introduction of legislation such as the Disability Discrimination Act (1995) in the UK and the proposal to extend the accessibility requirements of the Building Regulations to housing in England and Wales. At the same time, the link between social housing and social exclusion is gaining greater recognition by governments (DETR, 1999).

Housing authorities have been responsible for the special needs of people with disabilities since the Chronically Sick and Disabled Persons Act (1970). Growing pressure from disability groups has ensured that legislation is becoming increasingly stringent regarding disability rights. The Disability Discrimination Act (1995) affects any one who provides goods, facilities or services to the public, whether for profit or without charge. It is illegal to refuse to serve someone who is disabled or to offer a disabled person a service which is not as good as the service being offered to others, or on different terms. Similarly, it is illegal to make it impossible or unreasonably difficult for a disabled person to use the service or goods. Where a physical feature of a service provider's premises makes it impossible or unreasonably difficult for a disabled person to use a service, the provider must take reasonable steps to:

- remove or alter the feature;
- provide reasonable means of avoiding the feature; or

- provide a reasonable alternative method of service (Disability on the Agenda, 1996).

In terms of property, it is illegal for any one who sells or lets land or property (and their agents) to discriminate unreasonably against disabled people. For example a landlord cannot charge a disabled person a higher rent than anyone else or refuse to lease premises to a disabled person.

Housing associations and other social housing organisations are obliged to maximise the accessibility of existing estates, often with limited resources. However, if accessibility requirements are incorporated into routine maintenance programmes through careful planning, many of the financial costs can be reduced. Research commissioned by the Joseph Rowntree Foundation (Bonnett and Walliman, 1996) has demonstrated that many lifetime home standards can be incorporated into older homes during routine repair programmes at little or no extra cost. Bonnett notes that, with the majority of houses in the UK dating from the first half of the twentieth century, and with one in four households including an elderly person or a person with a disability, this approach will become increasingly important.

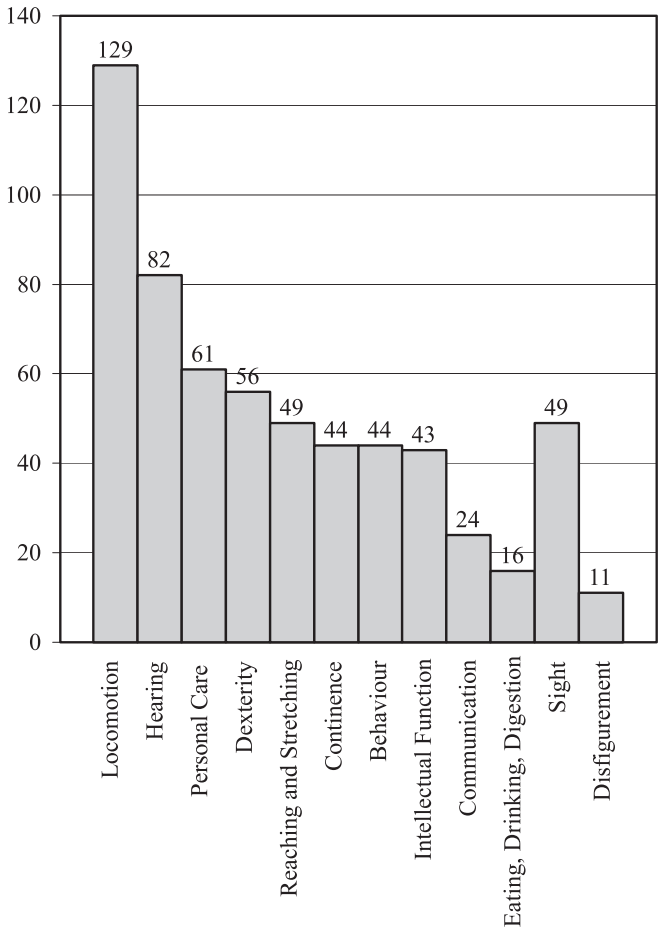
Most of the research into housing accessibility, such as lifetime homes standards (Joseph Rowntree Foundation, 1991) and barrier-free housing (Scottish Homes, 1995) has focused on the accessibility of the interior of the dwelling or the immediate external environment. However, regardless of the level of accessibility, a person with mobility problems is unlikely to benefit if the external environments and estate facilities are inaccessible. Visitability is also an important concern for residents (Edge *et al.*, 1998; Martin, 1992).

In one way or another, whether in height, weight, strength, speed of movement or dexterity, everyone is different. Universal accessibility is the integration of these differences into one design philosophy that caters for everyone. It aids independent living and therefore reduces the social exclusion experienced by people with mobility problems, including wheelchair users, elderly people, pregnant women or people with young children, people with sensory or cognitive problems, and those with temporary injuries, amongst others. Only when buildings and landscapes are universally accessible, can all members of a community participate fully in political, democratic, economic, social and cultural life.

Figure 1 has been extracted from data compiled by the Northern Ireland Policy, Planning and Research Unit in 1990 and illustrates the numbers of people in private households in Northern Ireland with different types of disabilities. The unit suggests that there are an estimated 188,000 people with disabilities living in private households in Northern Ireland (out of a total population of approximately 1.6 million in 1990).

There are numerous reasons why the existing environments of many housing estates are inaccessible to greater or lesser degrees. The age of the estates, lack of resources, lack of awareness of accessibility issues, the ageing population, the introduction of policies such as Care in the Community, technological advances and the increased life expectancy of many people with disabilities have all contributed to the current level of accessibility of external environments and there are many other factors involved.

Figure 1 Estimates of people in Northern Ireland by type of disability



Palfreyman (1997) notes that accessibility is determined both by the basic design and the quality of maintenance and repair work. She attributes the current degree of accessibility of the environment to the ubiquitous car; confusion over responsibility for repair and maintenance; profusion of legislation relating to footpaths and highways and a lack of resources.

One particular problem has been identified by the Scottish Centre for Environmental Design Research: "for the most part the people involved in designing, producing and occupying the houses are not party to the thinking which generated them" (Edge *et al.*, 1998).

The project resulted in a demonstration house design based on "the premise that design for life-cycle optimisation cannot be restricted to maximising a building's physical life, but must be sensitive to situational and social dynamics during its life-cycle and the life-cycle of its occupants". The authors conclude that "ultimately, the qualification of housing as being for the 'disabled', 'the elderly', or other 'special needs' group should become redundant".

Not only should designers consider the needs of the end-users but also the character and location of the estate. Mouncey Westbury Associates (1998) also emphasise that every development is unique and that every site offers specific opportunities and constraints and that design solutions should therefore be unique.

It is in this context that a major research investigation has been undertaken in relation to a housing estate in South Belfast, Northern Ireland. Its purpose is to determine the present levels of accessibility in relation to the current literature and to residents' perceptions, and to develop an accessibility appraisal model to assess and compare levels of accessibility in and between social housing estates.

Obstacles to external accessibility

Location

Location is a critical factor in housing suitability, especially for those with mobility problems (Pickles, 1998), and can have a great impact on levels of stress and satisfaction amongst residents. A survey of council tenants in Gateshead, England found that satisfaction with their home was determined by location rather than by housing type or condition (Ineichen, 1993). In this context, developments must be sited to allow residents to feel part of the local community, with easy access to facilities and well served by public transport with connections to work, social and leisure opportunities (National Housing Federation, 1998). In particular, developments should be within approximately 1km of local shops, a telephone box, a primary school, a health facility and a park or open space and within approximately 0.5km of a bus or train route with access to secondary schools, cultural and entertainment facilities, leisure centres and commercial centres. Furthermore, the housing corporation's sustainability index recommends that new developments should be located within ten minutes walk of the following facilities:

- post offices;
- banks and building societies;
- public phones;
- doctors;
- dentists;
- schools;
- places of worship;
- pubs and clubs; and
- libraries (Dwelly, 1998).

Roads and pavements

Important accessibility issues regarding pavements include such physical characteristics as width, crossfall, the nature of the surface, manholes, gratings and other trip hazards, upstands, dropped kerbs and street furniture. In relation to roads, the factors to be taken into account are parking, transport and traffic management as well as maintenance of the roadways. The following principles are typical of the available guidelines in relation to pavements:

- obstacles should be as far away from the walking route as possible;
- every unexpected obstacle on the walking route should be marked by means of contrasting colours and/or differences in texture (DETR, 1998);
- resting areas should be provided along a walking route (CCPT, 1996);
- surfaces should be level and firmly fixed with no protruding paving slabs to trip over or puddles to avoid; and
- wider pavements improve the quality of life for people with prams, buggies and

shopping bags as well as wheelchair users (Palfreyman, 1997).

In relation to parking, the key issues include: the distance between parking spaces and the most likely destination should be as short as possible; the number of accessible parking spaces should be maximised; "improper use" should be discouraged by markings, signs or posts; entrance and exit areas should be finished with a non-slip, even layer; automatic installations should be mounted between 850mm and 1100mm above the street; signposting should be provided (CCPT, 1996); and car ports by entrance doors should be provided where possible (NIHE, 1995).

Transportation

Road systems and pedestrian walkways should be designed to maximise accessibility and to minimise travel distances. Public transport planning should be integrated with the processes of estate planning and should reflect the needs of the community. The National Housing Federation (1998) considers that all provision for transport (roads, cycleways, footpaths, car and bike parking) must meet residents' needs for safety, security and convenience, and be on a human scale. Social landlords should, as far as possible, ensure road design and layout places the needs of pedestrians and cyclists before those of the car. Safe cycle routes should be provided. In relation to transport stops, the CCPT (1996) make a number of recommendations, including that stops and vehicles should be adapted to each other to avoid level change; the stop should be free of obstacles; the stop should be situated as close to the most likely destination as possible; information displays should be visible and comprehensible from a distance; and a non-slip and even finish should be used for the exit and entrance surfaces.

Level change

Level changes introduce mobility barriers and safety risks in the external environment and should be avoided if at all possible. Steps and excessive gradients produce problems for everyone, not just those using mobility aids or pushing prams or trolleys. Again, a series of recommendations has been proposed by CCPT (1996) and the National Housing Federation (1998). These include: resting and passing places should be provided in hilly areas; slopes should be finished with non-slip, even and uninterrupted surfaces; differences in level of 20mm or more should be avoided, rails should be mounted on both sides of ramps which cover a difference of level of more than 250mm; high and low handrails should be mounted on both sides of stairs and make them extend 300mm or more beyond the first and last riser; handrails should be designed so that they offer good support and so that it is clear where they end. Handrails should continue on landings; adequate lighting should be installed and every riser indicated by contrasting finishing. The beginning and end of stairs with tactile finishing should be marked; a ramp or lift should be provided as an equivalent facility in addition to stairs.

Wayfinding

Good circulation and wayfinding design is essential to accessible housing estates. Well-designed wayfinding aids visitors and service providers. Adequate signs and street names may prove crucial in case of emergency. Indeed it is essential that emergency services can negotiate a development easily and quickly. Directional and street signs are the most common aids to wayfinding. In this respect signs with simple symbols should be used; signs should contrast with their background; adequate lighting with important signs and markings should be provided; signposting should be installed alongside the walking route; signposting for individual groups of disabled people should be avoided as much as possible (CCPT, 1996).

Security and safety in public areas

In many studies involving user participation, issues relating to crime, security and anti-social behaviour have been of paramount concern for estate users. Good design may inhibit crime and vandalism and reduce fear amongst the community by reducing the level of what Coleman (1985) describes as "confused space". Another issue is the necessity of a clear distinction between public and private space (Harriott and Matthews, 1998). The National Housing Federation (1998) considers that residents must be able to enjoy reasonable privacy in their homes and gardens, and feel safe in the public areas of the development. In this context, the Federation provides a range of guidelines and

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principles to maximise safety and security, which attempts to achieve a balance between safety and privacy for residents and visitors. Key considerations include: the orientation of dwellings should reduce impact of external noise and avoid overlooking habitable rooms but should allow natural surveillance of unexpected visitors; pedestrian routes should be open and designed to enhance security; play spaces should be in plain view; the lighting scheme should ensure visual security; grouped parking spaces should be clearly identified with the dwellings they serve and should be overlooked by their dwelling; adequate lighting should be provided.

Research into the external environments of housing estates

In order to improve accessibility in line with the legal and social responsibilities of the housing provider towards its tenants, a surveyor or architect should first audit the level of existing accessibility. However, the standard accessibility auditing process is relatively costly in terms of both financial resources and time. With limited resources and a large stock (140,000 homes in the case of the Northern Ireland Housing Executive), a housing provider may find it impossible to undertake in-depth audits of all its estates.

In order to resolve this problem, the University of Ulster, in partnership with the Northern Ireland Housing Executive (NIHE), undertook a research project into accessibility appraisals. The aim of this research was to produce a survey tool that would allow the housing providers to adopt a two-stage approach to the assessment of the existing levels of external accessibility of housing estates and the feasibility of improving accessibility to universal accessibility standards. It would allow the housing provider to identify and prioritise estates for more detailed auditing.

To achieve this aim, a sample site was selected in South Belfast, Northern Ireland. Information gathered related to the location of the site and its links to services and facilities in the wider community, the views and experiences of support and professional service providers to the estate regarding accessibility, the views of site residents, and the accessibility impacts present on the site, which were identified through existing accessibility auditing checklists (Fearns, 1993) and the knowledge and experience of external consultants.

This data informed the design of a questionnaire (see the Appendix) to assess the estate residents' perception of the accessibility. This questionnaire was administered to a sample of 300 residents who were asked to rank a number of accessibility impacts. The hierarchy is shown below:

(1) speeding traffic;
(2) lack of or inadequate directional signs;
(3) lack of maps;
(4) lack of traffic calming;
(5) lack of or inadequate seating in public areas;
(6) traffic danger spots;
(7) layout of estate;
(8) lack of or inadequate street signs;
(9) ease of use by emergency services;
(10) location or otherwise of pedestrian crossings;
(11) vandalism of phone boxes;
(12) fallen leaves/snow/ice;
(13) rubbish dumping;
(14) gradients of routes;
(15) maintenance of play areas;
(16) slippery surfaces;
(17) steps;
(18) noise levels;
(19) distance of dwelling from parking;
(20) handrails;
(21) adequate street lighting;
(22) distance of dwelling from public transport;
(23) vandalism of lighting;
(24) height of kerbs;
(25) obstacles such as bollards;
(26) maintenance of security intercoms;
(27) maintenance of lighting;
(28) potholes;
(29) blocked drains;
(30) traffic levels;
(31) width of pavements;
(32) distance of dwelling from local facilities; and
(33) rubbish collection.

The universal accessibility appraisal model

Based on the analyses of the empirical study, the literature review and the principles of universal accessibility, the partnership has

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developed an accessibility appraisal model for surveyors. The purpose of the model is to rank external accessibility elements in terms of priority and feasibility and to provide the NIHE with an appraisal tool kit to determine estate accessibility requirements and inform development briefs for external upgrades. The model will be available in a user-friendly electronic format (Microsoft Access) that will allow easy identification of problems as well as rapid comparison across estates. This will enable surveyors appointed by the NIHE to appraise existing sites accurately, effectively and rapidly.

Aspects of the estate to be appraised will include:

(1) Location and proximity to facilities:
   - Primary: shops, primary school, bus stops, post office, park, open space or play area, telephone box.
   - Secondary: health centre/doctor, dentist, train station, bank/building society/ATM, place of worship, library, entertainment – youth, entertainment – family.

(2) Pavements, walkways and roads.
(3) Transportation and parking (including residential parking and parking at estate facilities).
(4) Wayfinding and circulation.
(5) Level change.
(6) Safety and security.
(7) Public areas.

Each aspect is divided into a number of elements (i.e. gradient of the pavement). A minimum accessibility standard will be identified for each element from existing NIHE and other literature. The surveyor will rate each element in relation to the percentage of the estate (or sector of the estate) that meets this standard. A score will then be awarded to each percentage bracket:

- 5 = 100 per cent;
- 4 = 80 per cent;
- 3 = 60 per cent;
- 2 = 40 per cent;
- 1 = < 40 per cent.

A weighting will be awarded to each score according to the importance of the relevant element.

Simultaneously the surveyor will award a score to each element based on the potential for upgrade as follows:

- 5 = upgrade can be achieved very easily and cheaply;
- 4 = upgrade can be achieved easily with some expense;
- 3 = upgrade can be achieved with some expense;
- 2 = upgrade can be achieved with some difficulty at greater expense;
- 1 = upgrade can be achieved with difficulty at expense; and
- 0 = upgrade cannot be achieved.

The model will provide a total score for each aspect of the estate (i.e. pavements, parking) and will present the overall results as follows:

- A line graph may be produced that plots the scores achieved by elements and the potential for upgrade: the area between the two lines will enable the rapid identification of areas for improvement and prioritisation (Figure 2).
- The results (estate, section or element score) may then be plotted on a graph in order to provide a comparison between estates i.e. in Figure 3, the "X" axis value could represent an entire estate or an element within that estate compared to the same elements on other estates.

The model will be tested on a number of estates and refined where necessary. It is envisaged that much of the survey work could be desk-based research. Overlay topographical or transport maps for example as well as geographical information systems could allow the surveyor to complete many responses to the universal accessibility appraisal model.

The estates or elements requiring priority accessibility upgrades thus identified can then be the subject of a detailed accessibility audit. Less urgent accessibility impacts may be incorporated into existing maintenance programmes.

Figure 2 Accessibility appraisal of estate

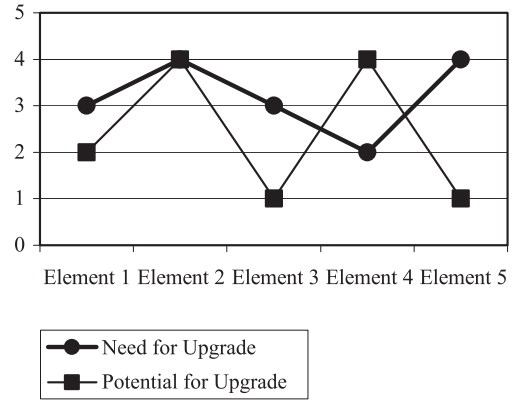
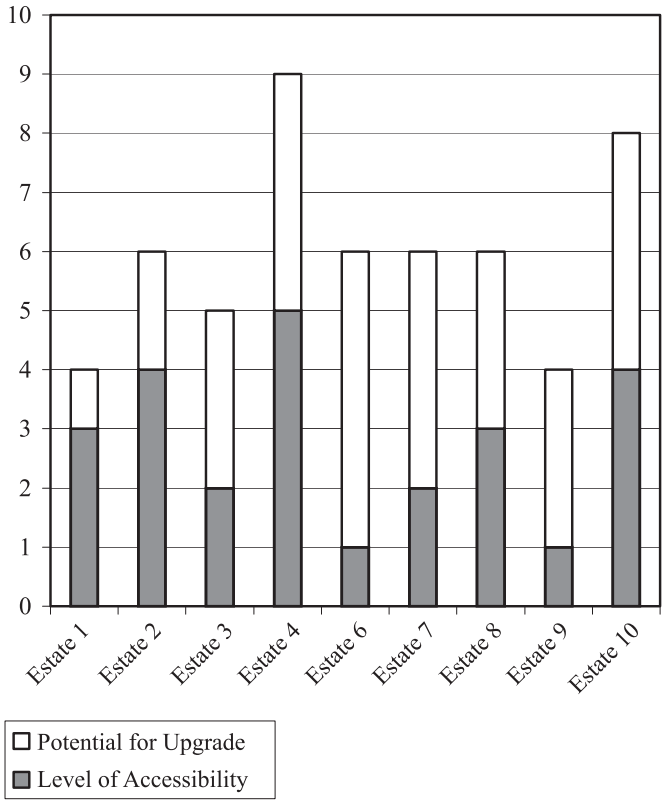


Figure 3 Comparison of levels of accessibility and potential for upgrade between estates



Conclusions

User requirements and living patterns in social housing derive from a large number of variables, which are further complicated by the ability of the individual to cope with his or her physical environment. When upgrading the external environment of social housing estates, the first priority must be the user. As indicated in this paper, user profiles (the ageing population and the increased number of people with disabilities living in their own homes) and user expectations (informed by new legislation) are changing. To upgrade a service facility or any other aspect of an estate without considering its accessibility is to miss an opportunity and to neglect a responsibility to tenants. In recognition of this, the Northern Ireland Housing Executive is seeking to incorporate within its improvement schemes and maintenance programmes an appraisal of the elements that offer the greatest potential for improving accessibility. In many cases, accessibility problems may be resolved in routine maintenance or management activities such as street cleaning or the replacement of signage.

The universal accessibility appraisal model provides the social housing provider or manager with the means to evaluate the external accessibility of an estate and to direct expenditure to those areas that will have the greatest impact on accessibility. With the development of geographical information systems and other relational databases, the surveyor can complete large sections of the model at his or her desk. The model will not eliminate the need for a more detailed accessibility audit in all cases, but it will provide a more cost-effective and less time-consuming means of maximising accessibility.

This type of appraisal system could be extended to include wider issues of health and safety and security. It could equally be adopted for other property sectors that use external space such as public parks and facilities, health care and educational facilities. Throughout this research it has become apparent that external accessibility is normally considered in relation to individual features rather than the strategic needs of the estate and its users. It only requires one accessibility obstacle to deter a user from enjoying his or her external environment or gaining access to normal services. By assessing the accessibility of an estate and its potential for improvement prior to a planned upgrade, the property owner gains a clearer picture of the areas that should be addressed. Areas or services that are identified as having restricted accessibility with no potential for improvement must be carefully managed and, where possible, alternatives should be provided.

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Appendix. Survey tool

The survey tool has been developed on a Microsoft Access database to allow for electronic data capture on site using a lap-top computer. The questions included in the survey are listed below.

A. Location and proximity

If the facility exists on the site it is also rated on a scale of 0-5 where 0 = very accessible to 5 = not accessible for both the location of the facility and the accessibility of the building(s).

Section 1: Priority facilities
(on site or within 1km of site)

(1) Do shops exist?
(2) Does a primary school exist?
(3) Do bus stops exist?
(4) Does a post office exist?
(5) Does a park, open space or play area exist?
(6) Does a telephone box exist?

Section 2: Secondary facilities
(on site or within 1km of site)

(7) Is there a health centre/doctor?
(8) Is there a dentist?
(9) Is there a train station?
(10) Is there a bank/building society/ATM?
(11) Is there a place of worship?
(12) Is there a library?
(13) Does youth entertainment exist?
(14) Does family entertainment exist?

B. Pavements, walkways and roads

For the remainder of the questions the percentage availability of the feature on the estate is scored on a scale of 0-5 where 0 = 0 per cent to 5 = 100 per cent. The potential for improvement is also scored on a scale of 0-5 where 0 = no potential for upgrade to 5 = upgrade can be achieved easily and cheaply.

Section 3: Pavements and walkways

(1) Are there pavements?
(2) Are the pavements wider than 1.2m?
(3) Is the gradient < 1 : 20?
(4) Are there dropped kerbs where required?
(5) Do the dropped kerbs meet current standards?
(6) Do the tactile pavements meet current standards?
(7) Does the pavement surface meet current standards in relation to evenness?
(8) Is street furniture correctly positioned and highlighted?
(9) Are the pavements kept free from rubbish, fallen leaves, snow and ice, etc.?

Section 4: Roads

(1) Is the road layout logical?
(2) Is the surface of the road even and free from potholes?
(3) Are there adequate traffic calming measures?
(4) Are there adequate, clearly marked pedestrian crossings at required points?

C. Transportation and parking

Section 5: Transportation

(1) Are there adequate transport stops?
(2) Are the transport stops clearly identifiable?
(3) Are information displays visible and comprehensible from a distance?
(4) Are there safe cycle routes?

Section 6: Parking

(1) Are there integral garages?
(2) Are there attached garages?

(3) Are these garages on plot?
(4) Are there parking spaces on plot?
(5) Are there separate garage spaces?
(6) Is there adequate street parking?

Section 7: Parking at estate facilities

(7) Is the distance between parking spaces and the likely destination as short as possible?
(8) Are there sufficient parking spaces?
(9) Are there sufficient accessible parking spaces?
(10) Do markings, signs or posts discourage improper use of parking spaces?

D. Wayfinding

(1) Are there sufficient maps, which are legible and correctly positioned?
(2) Are there sufficient street signs, which are legible and correctly positioned?
(3) Are there sufficient street signs, which are legible and correctly positioned?
(4) Is the layout of the estate logical and coherent?
(5) Are individual dwellings easily located?

E: Level change

(1) Are the slopes less than 1 : 20?
(2) Are there resting places in hilly areas?
(3) Are there sufficient, properly designed ramps?
(4) Are there sufficient, well-designed handrails on steps?
(5) Are the steps adequately lit?
(6) Do the handrails extend 300mm or more beyond first and last riser?

F. Safety and security, public areas

(1) Is there adequate street lighting?
(2) Are there adequate, accessible telephone boxes?
(3) Is vandalism of facilities a problem?
(4) Is there a problem with rubbish dumping?
(5) Is there a problem with traffic danger spots?
(6) Is there adequate, accessible public seating?
(7) Can plan areas be supervised from dwellings?
(8) Are play areas well maintained with non-slip surfaces?