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DISABILITY AND

THE BUILT ENVIRONMENT

by

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A research report submitted to the

Faculty of Engineering and the Built Environment,

University of the Witwatersrand, Johannesburg,

in partial fulfillment of the requirements for the degree of Master of Science

in Development Planning.

Johannesburg, April 2009

DECLARATION

I declare that this research report is my own, unaided work. It is being submitted for the Degree of Master of Science in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.

DEDICATION

I dedicate this Report to my wife, Mutele V. A., whose uncommon support and patience with me when this Report was being prepared is greatly appreciated and valued.

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To Dr. Karam, you are the most wonderful co-ordinator.

TABLE OF CONTENTS

DECLARATION ---------- **07**

DEDICATION ---------- **07**

ACKNOWLEDGEMENTS ---------- **07**

ABSTRACT ---------- **08**

CHAPTER ONE ---------- **10**

1. INTRODUCTION ---------- 10

1.1 Background ---------- 10

1.2 Research question ---------- 20

1.3 Research methodology ---------- 21

1.4 Research method ---------- 22

1.5 Limitations of the research report ---------- 26

2.6 Structure of the research report ---------- 26

1.7 Conclusion ---------- 28

CHAPTER TWO ---------- **30**

2. TERMS AND CONCEPTS ---------- 30

2.1 Background ---------- 30

2.2 Definitions---------- 30

2.3 Definitions od disability---------- 34

2.3.1 Old definitions---------- 35

2.3.2 New definitions of disability ---------- 35

2.4 Barriers to participation ---------- 37

2.5 Models of disability in perspective ---------- 38

2.6 Individual/Medical model of disability ---------- 38

2.7 The social model ---------- 43

2.8 Conclusions ---------- 46

CHAPTER THREE---------- 48

3. LEGISLATION AND POLICY---------- 48

3.1 Introduction ---------- 48

3.2 International instruments---------- 49

3.3 The Constitution---------- 50

3.4 White Paper on an Integrated National Disability Strategy (1997) ---------- 51

3.5 The Promotion of Equality and Prevention of Unfair Discrimination Act (2000)-- 52

3.6 Accessibility and the built environment legislative review ---------- 53

3.7 The Building Standards Act (Act 103 of 1977)---------- 54

3.8 The SABS 0400 Code of Practice ---------- 55

3.9 The National Building Regulations and the South African Bureau of Standards 0400 Code of Practice ---- 58

3.10 Conclusion ---- 59

CHAPTER FOUR ---- 61

4. CRITICAL ELEMENTS OF THE BUILT ENVIRONMENT ---- 61

4.1 Introduction ---- 61

4.2 Paths as a critical element ---- 64

4.3 The meaning of edges to visually impaired people ---- 69

4.4 The role of landmarks in decision-making by visually impaired people ---- 71

4.5 Spatial performance at junctions by visually impaired people ---- 73

4.6 Conclusion ---- 76

CHAPTER FIVE ---- 77

5. FUNDAMENTAL QUALITIES OF LOCALITY FOR OCCUPATION ---- 77

5.1 Introduction ---- 77

5.2 Sensibility as an essential aspect of the built environment ---- 77

5.3 Access as an environmental characteristic ---- 80

5.4 Conclusion ---- 84

CHAPTER SIX ---- 85

6. INTERVIEW ANALYSIS ---------- 85

6.1 Introduction ---------- 85

6.2 Background ---------- 86

6.3 Analysis ---------- 89

6.4 Self-induced confusion ---------- 89

6.5 Situational confusion ---------- 90

6.6 Self-reliance and confidence ---------- 94

6.7 Coping strategies ---------- 95

6.8 Envisaged environmntal modifications ---------- 97

6.9 Conclusion ---------- 105

CHAPTER SEVEN ---------- 107

7. RECOMMENDATIONS ---------- 107

7.1 Introduction ---------- 107

7.2 Attitudinal barriers ---------- 107

7.3 Organisational barriers ---------- 108

7.4 Environmental barriers ---------- 108

7.5 Solutions to attitudinal barriers ---------- 109

7.6 Solutions to organisational barriers ---------- 110

7.7 Solutions to environmental barriers ---------- 111

7.8 Further recommendations ---------- 113

CHAPTER EIGHT ---------- 116

8 Conclusion---------- 116

9. INDEX ---------- 119

10. REFERENCES ---------- **129**

ABSTRACT

The research report highlights the barriers encountered by visually impaired persons when navigating the built environment. As will be seen, the three primary barriers that are discussed include attitudinal, organisational and environmental barriers. Environmental barriers usually receive the most attention (Stienstre et al, 2002). This barrier is given the most attention largely because of its impact on the lives of the disabled people.

In addition to that, it is the right of citizens as outlined in the Constitution to have access to an environment that is not harmful to a person's well-being (Republic of South Africa; Act No. 108 of 1996). In light of this Act, the researcher undertook to explore how visually impaired people interact with the built environment and how these experiences could influence or enhance approaches to planning and design of the built environment. There are various methods and techniques that visually impaired people use to navigate the built environment that allow limited access, but because planners are interested in visual signs, these are not taken into consideration and incorporated as a matter of course.

The report explains key concepts that underpin the behaviour portrayed by society, particularly with regard to attitudes and legislation. Principally, the social and medical models of disability are thoroughly engaged. In essence, these models of disability explain what is regarded as the root cause of discriminatory legislation as well as the adverse impact that environmental barriers pose to equal participation in society.

Various elements of the built environment are discussed and their impact on the daily experiences of visually impaired people, particularly when moving around. The researcher has found these elements to be vital as they play a central role in dividing the environment into smaller, clearly connected and more manageable sections that could be directly encoded into a hierarchy of spatial knowledge

Information from the interviews is presented to demonstrate the adverse state of the built environment using the experiences of the interviewees. Responses to

overcoming these barriers are outlined and recommendations made. For example, even though structural environmental barriers are frequently more complicated to remove, they can be designed-out when an area is upgraded. Given the constitutional mandate as mentioned above and the myriad of information regarding the difficulties encountered by visually impaired people, the research report concluded by emphasizing the fact that it is important to ensure that when building are designed there shouldn't be other sections of the built environment that in any way excludes certain groups of people on the basis of their disability. The built environment should be designed in such a way that all people with or without impairment should be able to, without assistance, approach, enter, pass to and from, and make use of an area and its facilities without difficulties. The national Building Regulations should however be revised for this to occur especially Part S which is the section in the national Building Regulations which directly deal with disability issues whilst at the same time taking advantage of the Universal Access design guidelines.

A comprehensive bibliography is provided for further information, and includes the references used in preparing the research report.

CHAPTER ONE

1. INTRODUCTION

1.1 Background

Orienting oneself in the built environment and moving around quickly, with efficiency and independence, is indeed not a simple thing to do. It would basically require a sequence of highly cognitive processes which includes perception, coding, learning and the ability to recall spatial information (Espinosa, 1994). Similarly, a person should also be in position to access and particularly recall different kinds of previously acquired environmental knowledge. The knowledge in this case would be general knowledge about the space, specific strategies that would be utilised in the acquisition and structuring as well as integration of spatial information and the spatial products which are more or less structured schemas or representations of familiar environments (Liben, 1988). This kind of task becomes complicated in the case of visually impaired people, who normally experience problems when using the space, and amongst such problems encountered is access to the knowledge of surrounding space.

In essence, it has been proved beyond doubt that if a person is able to move and orient her/himself in the environment safely and independently she/he is more likely to have a sense of security and some degree of freedom. These two essential aspects remain crucial for one's integration in a society. The intention of this research is therefore to examine the way in which visually impaired people interact with the built environment to influence or enhance approaches to its planning and design, and how the built environment as a means of informing its users can be constructed to suit visually impaired persons who use the space without sight. Of importance is the fact that the constructed environment is largely used as an instrument that informs movement in space by displaying all the relevant characteristics and nature of a place. Therefore, it is crucial to investigate how it could also be user-friendly in the absence

of sight. Further intention of the research report however is to consider what sighted people can learn from the non-sighted people about navigating the built environment.

A human being has five main senses - sight, hearing, smell, taste and touch - which assist the human body to control and effectively use the surrounding environment. However, there is a common understanding that an absence of one of the five senses is more likely to make it difficult or almost impossible for the human body to perform its role with ease. Despite this generally held perception, the built environment can still be used effectively with the remaining senses to inform the missing sense (Guth, Hill & Rieser: 11, 1989). Indeed, it is the writer's belief that if the constructed environment which is well understood and experienced by a visually impaired person can be created, then it is possible to construct a first-class physical environment which is capable of stimulating all the human senses and hidden potential.

Another perception is of an unfounded fear that a built environment that caters for the visually impaired could undermine aestheticism which supposedly could only be accessed by sight. Undoubtedly, an environment could be created without compromising aestheticism which is, of course, of great importance to both visually impaired persons and the sighted community, as witnessed by Boshoff.

Boshoff (1997) understands aesthetics to be directly dependent on the ability to feel and sense. This statement clearly indicates that aesthetics as portrayed here is a judgment value that one reaches, having involved the process of perception or sensation. In this case, however, perception should be understood to mean the process by which mental image, or perception, of an object or experience is acquired. It normally involves a process of segregation and unification by which environmental stimuli are organised into specific forms (Weber, 1995). This particular phenomenon usually occurs when stimulus reaches one of the sense organs, which sends an electrochemical impulse through the nerve to the brain. In fact, the impulses provide the experience of perception or a sensation (Hesselgren, 1972). In the process, perceptual information is stored in the memory based on past sensations. This then explains why one is able to judge if something is beautiful or ugly. It just shows that the viewer has unconsciously put an aesthetic valuation within the person's perception. A physical environment could thus be created that is enjoyed by everyone

as visually impaired persons are also able to attach an aesthetic value to a stimuli in the emotional and physical world. However, with a visually impaired person one can rightfully say that their aesthetic judgment is influenced not by sight but by other senses.

It is also important to note that when creating a built environment there are certain things that are supposed to be taken into account. For instance,that the built environment should, through its ergonomics, be appropriate to the needs of those living there. The writer believes that the built environment can change people's lives in a positive way, which is the reason why a physical environment should always take into account issues of comfort and safety (Archidea, 2003). It is on this basis that it should be understood that the built environment is no less of an extension of nature into man-made territory, a crucial aspect of which is encouraging people to experience and understand the world (Pallasmaa, 1996).

It is therefore important and necessary for the built environment to have a direct and cordial contact with the body in a way that the body would understand and relate to it. This simply means that there should be a communicated message from the built environment to the user through the various senses. The communication network and processes should be understood in this fashion, in experiencing the built environment, the human body, particularly the eye, nose, ear as well as the skin, absorbs the information available in a space. Nonetheless, the challenge remains as urban designers continue to focus only on visual appeal. As a result, other senses have been considerably ignored or their importance undermined (Lawson, 2001).

This challenge has also been attested to by Pallasmaa P.21, who contended that "the inhumanity of contemporary architecture and cities can be understood as the consequence of imbalance in our sensory system". He goes on to say that the dominance of the eye and the suppression of the other senses tend to push these other senses "into isolation, detachment and exteriority" (Pallasmaa, 1996). Clearly, the adverse effect of only addressing the needs of the eye are more than an exclusion of other senses, and affects those who use the space without sight. This could be one of the reasons why many visually impaired people in South Africa have been excluded from mainstream society. This kind of exclusion continually manifests itself through,

amongst others, preventing visually impaired persons from accessing fundamental social, political and economic rights. This contributes to an environment in which sighted people's social attitudes perpetuate stereotypes of disabled people as dependent and in need of care. Furthermore, a discriminatory and weak legislative framework that approves and reinforces exclusionary barriers continues to be promoted and supported. Despite these negative aspects of exclusion, the built environment remains the greatest daily challenge of the non-sighted community (Integrated National Disability Strategy White Paper, 1997).

Barriers in the built environment that are of concern in this research result in a continual prevention of visually impaired people from enjoying equal opportunities with their sighted counterparts. A few examples of these barriers would normally include structural barriers in the built environment, inaccessible service points, inaccessible entrances and poor interior and exterior design (Howard & Templeton, 1966). It is important to consider that, as with any individual, for a visually impaired person to live independently, she/he needs to access their local community, use transport and find work. What this actually means is that visually impaired people must be able to explore and reach their full potential without being hindered by any aspect of the built environment. Accessibility has thus far been seen to achieve the opposite of what is desirable and should therefore be considered the major barrier to the realisation of independent living for visually impaired people (Gibberd, 2001). In essence, the difficulty of access negatively affects visually impaired people and intensifies the whole range of challenges that they encounter daily. In this regard, the built environment tends to serve as an apparent symbol of these difficulties. This is largely because the built environment is typically constructed in a way that symbolises a threat to visually impaired persons, and as a consequence it directly contributes in reinforcing their exclusion from the whole society (Guth, 1984).

In order to fully appreciate the problems encountered by this group of people, one should first acknowledge the fact that visually impaired people negotiate the built environment through the use of a long white cane that makes them aware of where they are by its feedback that is transferred from the tip of the cane. In fact, they rely solely on sensory and auditory information from the environment or additional assistive devices (University of Surrey, March, 2005). However, the white cane used

by visually impaired people can only be effective in immediate spaces. What makes an immediate space reliable to a visually impaired navigator is precisely the fact that it encompasses all the spatial characters or features that can be detected from one position and at that particular time; meaning that between the user and the detectable features of the built environment, nothing is supposed to encroach. The bump in the sidewalk that is suddenly under foot, the tree immediately to the right of the sidewalk that is discovered by the sound it reflects, the tricycle left in the middle of the sidewalk that is discovered by the use of the white cane, the step down into the street to the left of the sidewalk that is also discovered by the white cane, can be in the immediate space of a visually impaired person. Generally speaking, any visually impaired person who knows about these spatial features and their relationship as well as where they are located, would also know where it is safe to move (Psathas, 1970).

Of importance is that the deficiency of vision experienced by visually impaired people makes them unable to detect anything that is some distance away from them, or distant irregularities at floor level. Therefore, in cases such as this, to make sense of their surrounding environment, visually impaired people resort to actively search for locations along walls or other surfaces until they get to where they want to be (Foulke & Berlá, 1978). There is, however, no certainty that when such a method is used one would reach the destination easily, as there may be other complications. For instance, there may be open spaces that one may be surrounded by, resulting in the extension of search-time taken by a visually impaired person to get to the actual point as this is fully determined by the ability of the cane to identify the needed spatial features that would lead to that particular location. Thus, a visually impaired person tends to spend a lot of time and effort trying to locate a particular location which might not even be far from her/him, but because she/he must first have a physical contact with that particular spatial quality leading to the location, the time and effort required is greater. All these activities are bound to occur due to the fact that a visually impaired person cannot have a view of any special layout as a whole without physically exploring it (Marston & Golledge, 1998).

In the process of navigating the built environment, cracked and uneven paving presents a problem, and serves as a barrier to the visually impaired person, and could present a hazard. Cracked and uneven paving results in constant snagging of the cane

which can cause confusion to the user. Such disruptions may also contribute to a delay in reaching the intended destination on time, which then leads to frustration. In addition, a severe hindrance with regard to access is worsened by objects and clutter on the pavements, which could also lead to injury, and also losing direction through colliding with someone. In the main, objects which protrude at above waist height (e.g. some telephone cubicles) and cannot be detected by a cane are dangerous to the non-sighted cane user, as injury is more likely (Ungar, 1996).

Another major problem that negatively affects the visually impaired person is signage. Signs, both written and iconic, are crucial in guiding people through known and unknown environments. Their importance rests on the fact that they are also used on a daily basis to identify street intersections, buildings, transit stops, different transit vehicles, and important facilities like information stands. People who cannot read signs, such as visually impaired persons, experience difficulties when traveling through known and unknown spaces regardless of whether there are signs available or not. Visually impaired persons in South Africa face a serious problem as they are unable to access the information in signs. However, they could still take advantage of other cues that would normally assist them. Basically, these people cannot access cues about pathways and traffic flows, both vehicle and pedestrian, and may struggle to find doors, elevators, or other service points and facilities. In fact, the lack of easy and safe access that is necessary when negotiating urban spaces and public transit has been the major reason for visually impaired people to resort to taking few trips and only when they are accompanied (Marston & Golledge, 1998).

Most of the cues normally used by sighted people when navigating or moving around are visual by design. The visual nature of such signs makes them inaccessible to visually impaired people, and poses a serious challenge when visually impaired persons have to travel independently because it is hard to use such cues for direction. Under normal circumstances a visually impaired person would find it difficult to walk directly to the location without following a landmark, or even a straight path that can be used as a guideline. This clearly means that spaces that do not offer any sort of guidance to a visually impaired user are less likely to be accessible. Primarily, in any circumstance, varied as they are, for a visually impaired person to move around successfully, she/he actually has to integrate all the spatial features through mind-

mapping that would help him/her to explore the space drawing on the existing cues. Without sight, this poses a real challenge, and some sensory input is needed for substitution (Armstrong, 1977).

There is a further challenge inasmuch as where maps are available, they are not designed in a tactile version that would be accessible to a visually impaired person (Poulton, 1952). This makes it difficult to gain suitable and sufficient information about the environment and the way in which it is spatially arranged. A visually impaired person is therefore unlikely to have complete and accurate information about an unfamiliar area and how to navigate it independently without any restriction (Wiedel, 1983). The problem of lack of signage that can give guidance to visually impaired persons, obstacles to visually impaired travellers and large open spaces make the built environment 'illegible' for them (Miller, 1983).

There are methods, mechanisms, techniques and signals that visually impaired people use to navigate the built environment and which allow some limited access, but because sighted people are interested in visual markers they are not especially aware of these. Despite such difficulties and many other challenges encountered when navigating the built environment, with experience gained, visually impaired people develop their own set of skills which enables them to travel with relative safety and independence. Different tasks are accomplished through engaging different techniques that are critical for successful and effective use of the built environment. In applying these methods and techniques, what matters most is to ensure that visually impaired people are aware of the surroundings and immediate environment, the spatial quality and objects in it, the relationship of those objects to themselves and their relationship to one another (Guth, 1984). In essence, if the tactics/strategies used by visually impaired people when navigating could be incorporated in the moddles or design of the built environment and not only sight, then independent navigation by visually impaired could have been guaranteed.

Immediate space, mobility and orientation

The following devices and tactics are often used and are helpful when travelling:

- The use of existing knowledge of a place is helpful in that there is already an existing mental map for the person using the built environment;
- Listening to the different sounds along the path helps to establish the actual location in the path;
- The use of a cane helps in picking up close obstacles along the path and it also helps as a path guide especially in those areas where there is a curb to follow;
- The different smells along the way are helpful in providing information on a person's location, for example the heavy smell of coffee indicates a coffee shop.

In addition, a cane as an extended sensory system has attributes that are important by design, such as light weight and hollow nature which helps to detect the difference in materials, and the different sounds will indicate the hardness of surfaces, texture, and vibration.
An aluminium cane of shorter length and light weight makes it a very sensitive and efficient tool for transferring information to the hand (Dodds & Davis, 1989).

Generally speaking, pedestrians must have a continuous supply of spatial information to enable them travel and occupy space safely at all times. In the realm of visually impaired persons this happens through motor, sensory and cognitive skills (Coucelis, 1996). These skills will assist a visually impaired person to create a mental map which is helpful in the development of efficient orientation and mobility skills.

Mobility, according to Bronzaft, Dobrow and O'Hanlon (1976) is the ability to move through space, without knowing where you are, where you want to go or how to get there. To orientate is to establish one's position in relation to one's surroundings (Oxford Advanced Learner's Dictionary, 1999). Having understood the definitions of mobility and orientation it becomes obvious that they are inseparable because one cannot occur without the other. One cannot walk or move without knowing where one is and where one is going, which means that for one to complete the mobility task, there is a need to establish orientation first. Of importance here is to note that mobility, when consciously used in its real form and understanding by a visually

impaired person may not necessarily be translated into the ability to travel safely, comfortably, gracefully and independently (Brabyn, 1982).

Also related to position and motion are the issues surrounding haptics as defined by Fritz, Way and Barner (1996). Broader haptics encompasses touch as well as kinesthetic aspects. Haptic is a word generally used to refer to the sense of touch, and using touch for orientation and to help understand the immediate space information, or a sense of position, motion and force. The kinesthetic sense is also referred to as pro-preconception. According to Wikipedia (www.wikipedia.com) 'pro-preconception' is a sense that provides feedback solely on the status of the body internally. It is the sense that indicates whether or not the body is moving with required effort and where the various parts of the body are located in relation to each other. In a sighted person's body, sensory and cognitive skills will utilise the senses that have already been discussed, whereas in a visually impaired person these senses become important and are very sharp because they are regularly exercised.

There are, however, other important tasks related to moving that are accomplished differently by visually impaired persons. For instance, issues surrounding everyday living in a visually impaired person's life, such as locating an item, carrying out a task and getting around can be looked at by considering the two different spaces that exist - the immediate space and the remote space (Blasch & Stuckey, 1995).

The term immediate space as used throughout this report should be understood to mean the space of a blind person that is movable with assurance and safety and is generally smaller than that of a sighted person. This immediate space includes all the spatial features that can be observed or detected from one position and on one occasion (Blasch & Stuckey, 1995). This immediate space can be explored by a blind person through the haptic sensory system, and the information supplied by immediate space. Immediate space of a blind person is physically limited by how far a cane can go but it can be slightly larger if the ear is involved which will pick up sounds a few meters away.

Various tasks are therefore accomplished through employing various methods, such as the cane, for low resolution scanning of the immediate surroundings, using:

- Palms and fingers - for fine recognition of objects from texture and location
- Feet - for surface information
- Skin - for temperature changes
- Ears - for sound type and direction
- Nose - for smell identification.

Remote space

The term remote space, as opposed to the immediate space, is normally understood by integrating information acquired on different occasions as one moves through space. This information will come from spatial features that are beyond the immediate space. The remote space of a blind person is also smaller and less populated than that of a sighted person (Passini, Dupre & Langlois, 1986). This space can be explored by the auditory system, taste/smell system and to a lesser extent by the haptic system. The information is supplied by the ears, for sound type and direction; and the nose, for smell identification.

In other instances, three ways may be used for a visually impaired person's body to explore a space to understand it and at the same time create a reliable mental map. These strategies are known as the perimeter, grid and object-to-object strategies and have proved to be reliable. They are, however, also dependent on the use of the active sensory system of a visually impaired person (Smith, De l'Aune & Geruschat, 1992).

Strategies

The first strategy is called scanning, which involves acquiring information of any space by studying its perimeters. A second strategy is referred to as Grid which normally would be when one creates an imaginary grid in space and then through following the grid collects information about that space and maps the information onto the grid. The grid then acts as a reference to remember the space. The third strategy is the object to object scan, almost similar to the perimeter scan, which involves acquiring information by studying the positions of the objects in space. This is more effective where the objects are a fixed to one particular position (www.techdigest.com).

A perimeter scan movement happens only on the perimeters of the space being scanned. An object-to-object scan movement happens between the objects in space. Grid scan movements happen in an orderly way along the grid.

It is possible that in a new space, a visually impaired person may use any one of the three strategies or all of them depending on the complexity of the space. A blind person makes use of the cognitive information (information stored in the memory map) and perceptual information (information being obtained from the body perceptual devices like the active senses in a blind person) to gain a good understanding of the space and the environment. The effectiveness of perception depends, however, on the quantity, the relevance, the 'specificity' and accuracy of the information provided in advance of the need of it.

1.2 Research question:

Over the years, there have been numerous attempts to analyse the ways in which people mentally represent their knowledge about objects and the spatial relationships among them. Some analyses have been based on logic (Blasch, Welsh & Davidson, 1973; Psathas, 1976), whereas others have been based more directly on an empirical examination of what people seem to know about the spatial characteristics of objects and environments they have previously experienced (Cleaves & Royal, 1979). Despite different ways of approaching the issue, there seems to be general agreement that there are two primary and different ways in which spatial information may be represented: (1) as a route or sequence, or (2) as a map or synchronous gestalt.

A route-type representation encodes only the sequential relationships among objects. Thus people who represent information as a route learn a series of movements that connect landmarks. For example, a visually impaired person might learn that to get to the shopping centre from her house, she has to turn right at the front gate, proceed along the street for two blocks, turn left at the petrol garage continue for one more block, and then turn right at the church. People who represent spatial information as a

map, however, extract an overview of the area and thus are aware of the relationships among objects even though they have not experienced all these relationships directly.

Regarding the ability to navigate in an environment, the implications of these different representational modes are obvious. To go back to the previous example, suppose the road between the gas station and the church were closed to traffic. The woman with the route-type representation would have to rely on trial-and-error methods to reach the shopping centre (unless, of course, she had previously learned an alternate route). A person with a map-type representation would immediately be able to formulate another route. This person's knowledge of the relationships between the parts would enable her to select an appropriate equivalent path.

For sighted persons, the mode of spatial representation is rarely a matter of concern because maximum spatial efficiency is not necessary for day-to-day living. For visually impaired persons, efficient spatial representation can mean the difference between successful and unsuccessful navigation, and between independence and dependence. Despite this, little is known about the development of spatial representation in blind people or the various factors influencing the ability to use a particular mode of representation. With this in mind, research on spatial representation in visually impaired people was undertaken. In essence, the research report will attempt to answer the question:

How can the way in which visually impaired people interact with the built environment influence or enhance approaches to planning and design of the built environment?

1.3 Research Methodology

One of the rights of citizens as outlined in the Constitution (1996) is to be in an environment that is not harmful to a person's well-being (Republic of South Africa). Contrary to the constitution's assertions, however, environmental barriers are a direct cause of disability discrimination, as explained in the research report. It has been

proven by researchers that current designs of the built environment cause disabled people physical, sensory or mental discomfort, even injury. Disabled people, by their definition, are frequently prone to this problem. In South Africa, the causes of an inaccessible environment can only partly be accredited to the apartheid regime. Whilst the effect of the apartheid regime may indeed have worsened the impact of environmental barriers for disabled people, such barriers are also present in countries with no apartheid planning, in both urban planning and building design. This international phenomenon has led to the term 'Architectural Apartheid', which reflects a deep societal and cultural form of environmental discrimination against people with disabilities. The term is actually an acknowledgement that environmental barriers are not only unnecessary, but also a discriminatory means of separating disabled people from non-disabled people, and reflects an act of undermining the dignity of disabled people as it fails to take into account the fact that people with disabilities strive to live a normal life like any other citizen.

Such discrimination has prompted the author to explore how the built environment could be designed in a manner that is user-friendly to visually impaired persons, and how this knowledge could inform approaches to planning and design more generally. The report examines the problems/difficulties encountered by visually impaired people in their daily interaction with the built environment, through interviews with visually impaired people living in or around Pretoria North (Gauteng). It is hoped that the information included in this research report will assist urban designers to begin to make a difference in the way in which the built environment is designed.

1.4 Research method

In order to make this report as informative as possible, extensive desktop research and review of literature has been conducted. Desktop research, as opposed to original research, involves the accessing of information from published resources and non-published sources, and relies on secondary sources of information, thus known as secondary research. The manner in which this kind of research is conducted would normally include reviewing and summarising information, citing actual documentation, and promoting the researcher's overall understanding and analysis on

the search topic. Desktop research is less costly than original research and also saves time. It is also largely available in electronic format for easier access (www.delaneywoods.com.au/desktop_research.html)

In addition, various groups from different institutions have been engaged in order to gain a deeper understanding of the problems encountered by visually impaired people as well as the attempted measures aimed at mitigating these adverse conditions. Institutions representatives interviewed include, Mobility instructor Zandi Fundama from Optima College For the Blind, a representative from National Association for the Blind Lydia Ndeme. Groups that were interviewed include visually impaired people ranging from 16 years upwards as they are likely to be in school, working or active in any other activity that would require them to move around the city. This group plays a central role in the research as their daily experiences provide core information. Further information on the interview process is provided below.

The research uses qualitative methodology, which is an approach in which the procedures are formalised and explicated and the scope less defined in nature; the researcher does the investigation in a more philosophical manner (translation). This methodology is advantageous largely because it is not based on fixed and rigid procedures; as such it provides a set of strategies within which to organise the research and to collect, process and interpret data. When conducting this research preference will be given to the concepts that capture the meaning of the experience, action, and interaction of the interviewees with the built environment. The application of unstructured (open) questionnaires and interviews will be conducted in a flexible manner (Keppel, 1995).

According to Borg & Gall (1989:) qualitative research involves an holistic investigation in a natural context. The researcher tries to study all the elements that are present within that particular situation, and to understand a phenomenon within its social, cultural and historical context.

Of importance is that the research for the report was essentially sensitive in two ways. Firstly, when talking about individual experiences these are, in light of the visually impaired experience, often distressing and highly personal. The writer attempted to

acknowledge this by not including highly personal information, although some interviewees did choose to speak more personally about their experiences. Secondly, the sensitivity of a topic is largely defined by the social context within which the research is conducted (Park, Radford & Vickers, 1988), and the disability question has recently become extremely politicised in South Africa.

The sensitive nature of the research had implications for recruiting participants. The National Association for the Blind (NAB) in Pretoria assisted with directly recruiting participants and accessing local visually impaired community members. The participants comprised seven people who were totally blind (no vision) and five people who were partially sighted. The respondents lived either in Pretoria North Urban Area or within a few kilometers of the Pretoria city centre. Various methods were applied in recruiting them as the writer had little knowledge of the community in question. The totally blind respondents consisted of two females and three males, aged between 20 and 35, who had been blind between two and thirty-five years. Three of the totally blind interviewees used a cane and two used a guide dog. The partially sighted interviewees comprised three females and two males, aged between twenty-three and thirty, who had been partially sighted since birth and used their remaining vision to navigate. With regard to Orientation and Mobility training, this varied considerably between the blind and partially sighted interviewees. However, the majority of participants had received orientation and mobility training after becoming visually impaired, including rehabilitation, guide dog or cane training and the learning of routes to places of relevance in their daily lives. Only two partially sighted individuals in this particular study had received no Orientation and Mobility training. All the data were collected between June 2005 and June 2006. Interviewees were not paid for participating.

The eventual sample size of twelve was acquired as originally planned. The main difficulty with recruiting participants related to the sensitive nature of the research. It was difficult to arrange interviews without the researcher being personally recommended. It was also felt that financial incentives would have been beneficial. The interviewees often mentioned how their organisations were underpaying them, so some remuneration for their time would have helped create a more even-handed exchange. Others actively researching this topic have expressed similar

methodological difficulties (Koser & Pinkerton, 2002: p.7; Robinson & Segrott, 2002).

It should be borne in mind that the qualitative method was chosen due to its emphasis on process, depth, complexity and roundness when explaining phenomena (Mason, 1996:, Maxwell, 1998). The open structure of qualitative interviewing allows for unexpected issues to emerge (Acredolo, 1988, 125-141). These relate to the research aims of attempting to gain insights into how visually impaired people view and understand the physical environment in their daily navigation of the built environment, particularly from home to the desired destination.

All the interviews were conducted in Pretoria, with the duration ranging from forty minutes to two hours. Three separate interview sessions of groups of four took place between June 2005 and June 2006. Interviews were carried out at the Optima College for the Blind. All interviews were taped, although some interviewees were initially resistant to this, possibly because of issues of sensitivity. In all interviews the same issue was addressed through different questions in an attempt to verify the understanding. The three groups of visually impaired interviewees were given similar questions but interviewed separately.

The interviews found, as has other research (Pellegrino, 1990), that the primary barriers encountered by visually impaired people in their daily experience could be divided into three groups: attitudinal barriers, organisational barriers and evironmental barriers. The environmental barrier which remains the core of this report was intensively discussed. Amongst others, findings revealed that visually impaired people become spatially confused (lost or disorientated) for two primary reasons - 'Self-produced' confusion, such as, for example, miscounting intersections (Loughborough, 1979), and 'Situational confusion' (Gray & Todd, 1965). What the writer found is that both types of spatial confusion cause feelings of fear and anxiety that lead to a loss of self-confidence, embarrassment and frustration, which in turn leads to less independent travel and exploration, and constrained patterns of spatial behaviour (Marston & Golledge, 1997).

Although visually impaired people are clearly non-homogenous it seems that many have the same experiences. For instance, individuals may make use of family members and friends as an alternative to lead them to various locations particularly if the visually impaired person is not familiar with the area. This means that social networks may determine the extent of movement. In fact, interviewees' experiences of problems and difficulties in their daily navigation were, essentially, similar to those outlined in the literature review. For instance, interviewees stressed that although travel to a familiar destination may provide relative safety from an immediate danger, it is impossible to feel entirely secure when travelling alone. However, the actual degree of safety felt by a visually impaired traveller in familiar places varied along the lines of mobility orientation and familiarity with the area as well as experience gained from other spaces. The interviewees made it clear, consistent with the literature, that they felt real concerns about the unfriendliness of the built environment in general (Kitchin, Blades & Golledge, 1997).

1.5 Limitations of the research report

Initially it was expected that groups like the municipality representatives, and people from the Office on the Status of People with Disabilities (OSDP), would be interviewed. However, the municipal representatives recommended that the IDP office be consulted, and there was thus no information provided by local government. The OSDP simply referred the writer to documentary sources that were otherwise available and have been drawn on in chapter 5. Furthermore, the fact that the subject in question has not been widely researched meant that less information could be obtained and used for this research report.

1.6 Structure of the research report

Chapter one introduces the research by giving background to the research, and explaining the research problem, aims and objectives. It further highlights various aspects of the methodology used in data gathering as well as application in the final

analysis of the report. The limitations of the process are also highlighted in this chapter.

Chapter two gives the theoretical and conceptual framework of the research. The content of this chapter is informed by concepts and theories applied in this report, including the following: Compensation model, Situational confusion, Self-produced confusion, Landmarks, and Social and Medical models of disability. Furthermore, it engages the two models of disability (the Social as well as the Medical model of disability), as they have been found to be critical in the manner in which society views disability. The impact of these two models of disability on the planning enterprise is alluded to, and also its development over time.

Chapter three covers the legislation and policy framework that informs the manner in which the built environment is designed. This outlines how these policies relate, hamper, hinder or augment the universal design principles, which could reduce the challenges encountered by disabled people. The chapter then suggests ways to address the policy deficits.

Chapter four introduces the critical elements of the built environment as well as their impact on the daily experiences of visually impaired people, particularly when moving around. The elements discussed include: Landmarks, edges, nodes and paths. These elements are discussed against the theories and concepts outlined in Chapter two.

Chapter five discusses fundamental qualities of the locality for occupation by visually impaired people.

Chapter six covers the analysis of the interviews and offers a practical illustration of how the theories, concepts, models of disability and the policies included in this report play themselves out in the daily experiences of visually impaired people.

Chapter seven offers a set of recommendations and demonstrates planning imperatives and how best these could be utilised to address the challenges. This is followed by a conclusion.

1.7 Conclusion

This chapter has attempted to outline a background of the research report by highlighting, first, the intention of the report. It made it clear that the intention of this research is to examine the way in which visually impaired people interact with the built environment to influence or enhance approaches to its planning and design, and how the built environment as a means of informing its users can be constructed to suit visually impaired persons who use the space without sight. This is largely because the constructed environment is largely used as an instrument that informs movement in space by displaying all the relevant characteristics and nature of a place. Therefore, it is crucial to investigate how it could also be user-friendly in the absence of sight.

In addition, the report is meant to consider what sighted people can learn from the non-sighted people about navigating the built environment. Such lessens would basically help a great deal in ensuring that a desired design of an accessible built environment is put in place. A desired built environment as indicated in this chapter would have to take in to consideration the fact that a human being has five main senses - sight, hearing, smell, taste and touch - which assist the human body to control and effectively use the surrounding environment However, despite the lack of one other sense, visually impaired people could still negotiate the built environment through the use of a long white cane that makes them aware of where they are by its feedback that is transferred from the tip of the cane. In fact, they rely solely on sensory and auditory information from the environment or additional assistive devices

What the above indicated mean is the fact that there are methods, mechanisms, techniques and signals that visually impaired people use to navigate the built environment and which allow some limited access, but because sighted people are interested in visual markers they are not especially aware of them. Be that as it may, it would not have been possible to interrogate and uncover the realities of this discourse without asking relevant questions. In this endeavor the research question to be answered was how can the way in which visually impaired people interact with the built environment influence or enhance approaches to planning and design of the built environment? The research used qualitative methodology in the process of gathering

and seeking the needed responses from various interviewees. This approach is applied in a manner in which the procedures are formalized and explicated and the scope less defined in nature, which meant that the needed information could be effectively solicited. However, in order to make this report as informative as possible, extensive desktop research and review of literature was also conducted. In essence, this chapter touched on the core reasons of the importance of conducting this research thereby laying a foundation,highlighting the stracture as well as indicating the limmitation of the research report and offering direction to all the ensuing chapters.

CHAPTER TWO

1. TERMS AND CONCEPTS

2.1 Background

This chapter seeks to briefly define and explain the relevant theories and concepts that will be useful as applied in this research report. They include terminology used to discuss disability, as well as key concepts in moving through the built environment. Their relevance lies in the fact that they offer the reader a broader understanding of the discourse, and will also provide further clarity on the underlying factors that influenced the research. Furthermore, two models of disability will be examined. As previously explained, visually impaired people are discriminated against in the provision of public facilities and the design of public spaces. The models of disability highlighted in this chapter will expand on these challenges and also identify tools that could be utilised in addressing them. The two models of disability are referred to as Social and Medical models of disability.

2.2 Definitions

This section briefly defines terms and words used in this research.

Deficit model of disability: According to this model, non-visual information is encoded within a visual spatial frame of reference, and the spatial performance of those who lack such a reference will be impaired (see, for example, Warren, 1970).

Compensation model: As opposed to the deficit model, the compensation model argues that in the absence of visual inputs, non-visual areas of perception in the brain may become more highly developed than in sighted people, so that the performance of people who are blind will be comparable, if not superior, to that of sighted people (see, for example, Rauschecker, 1995).

Situational confusion: The situational confusion is a spatial confusion that is caused by a localised occurrence that may be permanent or temporary in nature.

Self-produced confusion: Self-produced confusion is a spatial confusion caused by the actions or misperception or miscognition of the visually impaired person when navigating a route.

The Medical Model of Disability: this assumes that the impairment or condition that a person has is a key problem, the responses to which are cure or care. 'Part of the impairment may be deemed to be the person's 'bitter' response to it, and it is this attitude of the disabled person that will make the disability better or worse (Imrie, 1996).

The Social Model of Disability: The Social Model of Disability views the impairment as far less important. The environment, the attitudes of others and institutional structures become external problems that need solving. Disability is therefore not a fixed condition, and with the right modifications one may have impairment but not be disabled (Oliver, 1990).

Remote space: The remote space is understood by integrating information acquired on different occasions as one moves through space. This information will come from spatial features that are beyond the immediate space. The remote space of a blind person is also smaller and less populated than that of a sighted person (Passini, Dupre & Langlois, 1986).

Attitudinal barriers: Attitudinal barriers reflect both personal and societal feelings towards disability. The result of a negative attitude towards disability will be both the exclusion of disabled people from general activities and a misconception of what disabled people are capable of doing.

Organisational barriers: Organisational barriers reflect the attitude of any organisation that the disabled person endeavours to use. An organisation need not be defined in a purely business sense, but can include any social or governmental organisation. The result of a negative organisational barrier can be demonstrated in the failure of the organisation to accommodate disabled people, or in the failure of the organisation to adapt itself to accommodate disabled people.

Environmental barriers: This barrier is comprised of a combination of both the attitudinal and organisational barriers. The result of the environmental barriers is an inaccessible environment. This may be caused by the failure of project developers, designers or constructors to conceive that disabled people will use their facilities, or a lack of knowledge of the issues that affect them.

Perimeter scan: Perimeter scan is a particular movement that happens only on the perimeters of the space being scanned.

Object-to-object scan: Object-to-object scan movement happens between the objects in space.

Grid scan: Grid scan movement happens in an orderly way along the grid, using the route taken during an Object to-Object scan

Mobility: According to Bronzaft, Dobrow & O'Hanlon, (1976), mobility is the ability to move through space, without knowing where you are, where you want to go or how to get there.

Orientate: To orientate is to establish one's position in relation to one's surroundings (Oxford Advanced Learner's Dictionary, 1999).

Immediate space: The space of a blind person wherein it is possible to move with assurance and safety is generally smaller than that of a sighted person. This space (immediate space) includes all the spatial features that can be observed or detected from one position and on one occasion (Blasch & Stuckey, 1995).

Remote space: The remote space is understood by integrating information acquired on different occasions as one moves through space. This information will be coming from spatial features that are beyond the immediate space. The remote space of a blind person is also smaller and less populated than that of a sighted person (Passini, Dupre & Langlois, 1986).

Haptics: Haptics as defined by Fritz, Way & Barner (1996) includes broader haptics which encompasses touch and kinesthetic aspects. Haptic is generally used to refer to the sense of touch. It uses touch for orientation and to help understand the surroundings and immediate space information, or a sense of position, motion and force.

The pro-prioception or kinesthetic sense: According to Wikipedia (www.wikipedia.com) 'pro-prioception is a sense that provides feedback solely on the status of the body internally. It is the sense that indicates whether or not the body is moving with required effort where the various parts of the body are located in relation to each other'. In a visually challenged person's body, these senses become sharper because they are regularly exercised. The kinesthetic sense is also referred to as pro-prioception, and indicates whether or not the body is moving with required effort.

Pathways: Pathways are the routes that people use to move about. Thus, a built environment is made up of a number of main routes which people use to get to it and from it (Lynch, 1960).

Edge: An edge is said to be where the district ends even though in some districts there are no separate edges as these become assimilated into each other, and join at an edge.

Landmarks: Landmarks are the most outstanding visual features of the city. Most of them tend to be very large and can be seen from a distance, although some landmarks are very small and can only be seen at close range like a small statue in a park. Landmarks are an important element of urban form because they help people to orient themselves in the city and help identify an area (Lynch, 1960).

Node: A node is a centre of activity. It is a type of landmark but differs from a landmark by its quality and character of its active function.

Sense: Sense is regarded as the degree to which the settlement can be clearly perceived and mentally diffe rentiated and structured in time and space by its residents, and the degree to which that mental structure connects with their values and

concepts – it is the match between environment, the sensory and mental capabilities, and cultural constructs.

Access: A means or way to easily and safely approach, reach, enter, use and benefit from a physical space, building, facility or service (Towards a barrier-free society, November 2002).

Barriers: Obstacles and impediments that prevent people from free movement, decision-making, association and participation. They may be environmental (physical) or created by attitudes and systems.

Built environments: This refers to buildings, spaces and facilities that have been designed and constructed.

Exclusion: To be prevented by social systems from participating or benefiting; being shut out or left out because society is unable to accommodate different or special needs.

Perception: Sensing or perceiving something through the senses influenced by people's values and attitudes.

2.3 Definitions of disability

It is crucial to first offer the two definitions of disability aligned with the indicated models. There are two definitions of disability (the old and the new). The most recent definition is preferred over the old version as it offers practical solutions to the challenges encountered by disabled people. The primary barriers to participation informed by these definitions of disability will be explained in order to provide greater perspective. Over the past eight years, The World Health Organisation (WHO), which is responsible for providing an internationally recognised definition of disability, has developed a new definition; more attuned to the Social Model. This definition is in line with the description of the United Nations Standard Rules on the

Equalization of People with Disabilities, which are explained in the following sections. For comparison, the old and the new definitions of disability are given.

2.3.1 Old definitions

The 1980 WHO definition of disability, the International Classification of Impairments, Disabilities and Handicaps, known as ICIDH, defines 'Impairment', 'Disability' and 'Handicap' in the following way.

Category	Definition
Impairment	Disturbances in body structures or processes which are present at birth or result from later injury or disease
Disability	Limitations in the expected functional activity or restrictions in activity due to an underlying impairment
Handicap	Difficulties in performing activities of daily living like walking

(World Health Organisation, 2001)

Due to the blatant evidence of negative stereotyping in the categories used and within the definitions given, this definition became discredited amongst the international disabled community. This has led to a more objective terminology, which is reflected in the revised definition.

2.3.2 The new definition of disability

The new definition seeks to balance the social and medical models. This definition actually applies to everyone in terms of daily activities and participation in society, although it is mainly used in relation to disabled people, rather than non-disabled people.

This second, new edition of disability, the International Classification of Functioning, Disability and Health, commonly known as ICF, describes a number of concepts as outlined below.

Impairment is defined as 'problem(s) in body function or structure as a significant deviation or loss' due to a given health condition. The concepts of 'disability' and 'handicap' from the previous definition have been replaced in the following way: Disability is construed as being an 'activity limitation' and/or 'participation restriction' as a result of (an) impairment(s).

Activity limitations are defined as 'difficulties that an individual may have in executing activities'.

Participation restrictions are defined as 'problems that an individual may experience in involvement life situations.' The revised definitions are laid out in the following table:

	Part 1: Functioning and Disability		**Part 2: Contextual Factors**	
Components	Body Functions & Structures	Activities and Participation	Environmental Factors	Personal Factors
Domains	Body functions Body structures	Life areas (tasks, actions)	External influences on functioning and disability	Internal influences on functioning and disability
Constructs	Change in body functions (physiological)	Capacity Executing tasks in a Standard environment	Facilitating or Hindering impact of features of the physical, social and attitudinal	Impact of the attributes of the person

	Change in body Structures (Anatomical)	Performance Executing Task in the Current environment	World	
Positive Aspect	Functional and Structural Integrity Functional	Activities and Participation	Facilitators	Not applicable
Negative Aspect	Impairment Disability	Activity Limitation Participation Restriction	Barriers/ Hindrances	Not applicable

International Classification of Functioning, Disability and Health (ICF)

2.4 Barriers to participation

The negative effects of disability result in barriers that affect how an individual may function in an environment: Different environments may have a very different impact on the same individual with a given health condition. Basically, an environment with barriers, or without facilitators, will restrict the individual's performance, whereas other environments that are more conducive may increase that performance. In fact, society may hinder an individual's performance because it either creates barriers (for example, an inaccessible building), or it does not enable facilitators (for example, the non-availability of assistive devices). The kinds of barriers encountered by visually impaired people could, for the purpose of this chapter, be divided into three primary barriers as follows.

Attitudinal barriers

Attitudinal barriers reflect both personal and societal feelings towards disability. The result of a negative attitude towards disability will be both the exclusion of disabled people from general activities and a misconception of what disabled people are capable of doing (Stienstre, 2002).

Organisational barriers

Organisational barriers reflect the attitude of any organisation that the disabled person endeavours to use. An organisation need not be defined in a purely business sense, but can include any social or governmental organisation. The result of a negative organisational barrier can be demonstrated in the failure of the organisation to accommodate disabled people, or in the failure of the organisation to adapt itself to accommodate disabled people (Stienstre, 2002). The result of environmental barriers is an inaccessible environment, which may be caused by the failure of project developers, designers or builders to incorporate the needs of disabled people into their planning, or a lack of knowledge of the issues that affect them.

2.5 Models of disability in perspective

The various models will be assessed with regard to their usefulness in assisting the stakeholders to have a deeper understanding of and think analytically about disability in relation to the built environment. The writer has also shown throughout the chapter that the impairment is not the real problem but rather institutions and people, as well as the environment in general. Thus it will also be demonstrated why it might be useful to shift the focus away from impairment and onto the environment.

2.6 Individual/Medical model of disability

There are two fundamental points that need to be made about the individual model of disability. Firstly, it locates the 'problem' of disability within the individual, and secondly it views the causes of this problem as stemming from the functional limitations or psychological losses which are assumed to arise from disability (Zarb,

1992). It suggests that the root causes could largely be traced to what one could refer to as 'the personal tragedy theory of disability' which generally suggests that disability must be viewed as some terrible chance event which occurs randomly to unfortunate individuals. This remains, and continues to be, one of the major struggles embarked upon by disabled people who are opposed to the approach taken by the Medical model of disability. Another central element of the Medical model is a focus on the 'deficits' of the disabled person.

The few aspects of this model indicated above demonstrate the flaws that make this approach unacceptable as a legitimate perspective that could be taken advantage of when dealing with the problems facing visually impaired people in their daily lives. The fact that the approach advocated by this model calls for the promotion of medical and rehabilitation to address issues of disability makes it less favourable as will be explained further. These practitioners are actually viewed as the experts in disability issues even more than the disabled people themselves.

Furthermore, much of the emphasis is put on 'rehabilitating' people with disabilities, with the belief that in the long term they would then be able to live what is referred to as a 'normal' life (Oliver, 1990). It is important to understand that disabled people are seen as abnormal because of their disability and this is often justified through the behaviour portrayed by medical practitioners who have the 'responsibility' of curing disability. The approach taken, therefore, is to rally people around the understanding that it is impairments which directly cause a person to be disabled. Basically, the message conveyed here is that disability has to be understood and viewed as a kind of 'personal tragedy' or affliction which strikes at random in the general population, causing a mismatch between a particular individual and his/her environment. For instance, the restricted mobility of a paraplegic is seen as directly caused by the lack of limb function (Morris, 1991). The assertions made by the champions of this model must be understood in the context of having their basis in the bio-medical sciences (for example, medicine, biology, physiology). This should provide a clear picture of what informs this model. For instance, the understanding that the physiology or anatomy of the disabled person is different and/or deviates from the norm make it clear that they attack the biological aspect of disability. Unfortunately, they also hold

the understanding that the differences referred to above render the disabled person redundant and unable to perform normal functions.

It should be borne in mind that the strategy used is that of ensuring that they portray disability as a pathology, defect, abnormality or dysfunction. Basically, this medical model implies that the disabled person is defective in one way or another. The consequences are negative, since such assumptions continue to play a major role in informing and creating stereotypes that are acted out daily. Such stereotypes reinforce the view of disabled people as being somehow inferior when compared with their sighted counterparts. Thus, this group of people is understood and portrayed as people who are lacking something or 'not quite whole' (Nigro & Neisser, 1983). The philosophy underlying this model could also be variedly taken to mean that disabled persons are lesser human beings. This may be reflected in the way that non-disabled people view disabled persons; it is also inculcated in the minds of disabled people, who are often expected to be appreciative of whatever they are offered by others, regardless of them having asked for it or not (Finkelstein, 1980).

The medical model continually undermines or discounts the whole package of experience that disabled people themselves have to contribute, as well as their knowledge of what could or should be done in dealing with issues of disability. Thus, instead of appreciating the fact that disabled people themselves could in one way or another contribute to the pool of knowledge held by the society, they are actually relegated to the far end and treated as people who cannot think for themselves, who always have to be 'helped'. In general, disabled people are actually given little or no opportunity to contribute to the analysis of their own situation, and are expected to defer to 'experts' (Oliver, 1990). It is also viewed by some disabled groups that the provision of a disability grant imposes certain restrictions on disabled people, since rather than helping them to acquire skills and employment, they are expected to live within the limitations of the grant (DSS, 1995).

As indicated above, the basis of the Medical model is premised on the understanding that, should there be any possible interventions or solutions for disability; it should largely focus on the impairment, and attempt to improve his/her condition so that he/she could then be accommodated and accepted as part of the society. Thus, if a

visually impaired person fails to act the way the society expects him to, he/she ends up being referred to as deviant. This means that, because s/he has not been successful in acting normally, s/he is expected to undergo a process of normalisation in order to become a full member of the society. In this process of normalisation, the major objective to be fulfilled is to ensure that disabled people adapt themselves to the demands of the physical environment (Zarb, 1992).

In fact, the entire medical and rehabilitation enterprise is premised on an ideology of normality, with the restoration of the disabled person to normality being the priority. However, where that is not possible, the secondary objective is to achieve a situation of as near normality as possible. In this instance, surgical intervention and physical rehabilitation, whatever its costs in terms of the pain and suffering of disabled individuals, is always enforced and justified (Engelkamp &Th. Pechmann, 1990). In essence, the medical model of disability sees the disabled person as the problem. If the person cannot be normalized, then s/he must be shut away in a specialised institution or isolated at home. The emphasis appears to be largely focused on dependence, reinforced by the stereotypes of disability that evoke pity, fear and patronising attitudes.

A further problem with the medical model is that many health practitioners as well as doctors tend to label their patients, but often fails to understand the fact that a diagnostic label attaches a stigma which is certainly harmful for a disabled person (Sherry, 1999). Thus, disabled people are entirely defined by what is seen as their inabilities and are given the blanket label of 'the disabled'. The major problem with this generalisation is that the label has hidden ideological overtones. By implication, disabled people are often conditioned to view themselves as a drain upon society's resources. It teaches them to be passive, to live up to the imposed image of themselves as objects of charity. Thus disabled people are actually expected to be grateful to receive, and to ignore the possibility that they may be active people who have something to contribute to society. This results in a sense of exclusion which is suffered by all disabled people from all spheres of socio-economic and political life, as non-disabled people are then made to understand that treating people with disability in an undignified manner is normal and acceptable (Baird, 1992).

When one focuses on visually impaired people in particular, it has been proved that the medical model has often been used to justify the removal of disabled people from the community. It is one of the main reasons visually impaired people have been segregated in sheltered workshops, institutions and special schools. The underlying message of such segregation is that visually impaired people do not belong in the community. The medical model has thus been identified by many disabled people as one of the major barriers to a decent life (Sullivan, 1991).

Conversely, the Social Model of disability does not deny the problem of disability, but locates it within society. According to this model the problem does not lie with the individual who has the functional limitations of whatever kind, but it is rather the failure of society to ensure that the appropriate services are adequately provided (Campbell & Oliver, 1996). In essence, it asserts that society has actually failed to ensure that the needs of disabled people are fully taken into account in its social organisation. Unfortunately, the adverse consequences of this sort of failure do not randomly fall on individuals but systematically upon disabled people as a group who experience this failure. This is mainly because discrimination has been institutionalised throughout society.

Oliver (1990) has argued that the medical model of disability is dominant in influencing the way people think about disability, both at the level of the general public and of professionals (politicians, planners, architects). It is evident that most people's thinking on these issues has become 'medicalised' in that the categories they apply to disabled people and the explanations given for their exclusion are based on this model. Similarly the same approach of control is exercised over disabled people by the design of the built environment, which presents many barriers. The built environment makes it either difficult or impossible for disabled people's needs to be met. Whether at work, school, leisure and entertainment facilities, transport, training and higher education, housing or in personal, family and social life, it is practices and attitudes that disable the disabled people (Oliver, 1976). In addition, pervasive ways of shaming disabled people are reinforced in the media, books, films, comics, art and language, and these are often internalised by disabled people, resulting in feelings of low self-esteem and limited achievement, further reinforcing disabled people's assessment of their worth (Oliver, 1990). One can with certainty say that the 'medical

model' approach on issues pertaining to disability creates a cycle of dependency and exclusion which is difficult to break.

It is, however, interesting to note that, increasingly, disabled people, individually and collectively, are rejecting the prescriptions of the 'normalising' society and the whole range of professional activities which attempt to reinforce it. Instead, they have begun to urge society to accept them the way they are, not as society thinks they should be. Disabled people are now promoting the view that it is society that is wrong and has to change, not disabled people (Maurer & Séguinot, 1995). Accordingly, disabled people are championing the view that the desired change should actually come as part of a process of political empowerment of disabled people as a group. This means that this change is not meant to take the form of social policies and programmes delivered by politicians and policy-makers or through individualised treatments and interventions provided by the medical and para-medical professions.

In the context of the built environment, it is implicitly assumed that the built environment evolved 'naturally' to suit the so-called 'normal' humans. The built environment (and also the social and economic environment) is treated as a 'given'. As a consequence, its nature, origins and design are not in any way questioned. It is then left to the disabled people, with the help of medical and rehabilitation professionals to adapt themselves as best they can to these existing structures. Generally, environmental modifications are rarely made, and then only be in extreme cases. Nonetheless, access facilities that are installed in buildings are seen as specific mobility aids. They are usually added on after the building has been designed and are usually not taken as part of the built environment (An Integrated National Disability Strategy White Paper, 1997).

2.7 The social model

As mentioned above, until the last few years, any discussion of disability had been focused either on medical 'cures' or, where cures were not forthcoming, on charitable support of various kinds. Both these approaches frame the individual disabled person as the 'problem'. Even though the medical approach is still widespread in this age and

time, there is increasing acceptance of the social model, which acknowledges the fact that the problem should be seen to be rooted in the structure of society itself. The Social model has the potential to address poverty, and has relevance for all manner of marginalised groups. Its strength lies in the belief that, if the problem is rooted in society itself, then what is needed is to change society not the individual. If society were constructed in a more egalitarian, inclusive manner then both poverty and the exclusion of disabled people could be addressed (SAHRC, 2002).

In recent years many development agencies have begun to adopt the 'rights-based approach', which provides for equal economic, cultural and social rights. It asserts that development work should be based on working for equal rights rather than on notions of charity. In terms of disability, the Southern African Federation of the Disabled (SAFOD) describes the rights-based approach as being about 'leveling the playing field so that people with disabilities have the right to access jobs, education, health and other services (Brisenden, 1998). A Social model, which is a rights-based approach, should therefore be understood to be about the removal of physical and social barriers. This approach calls for attitude adjustments for policy-makers, employers, teachers, health care professionals and even family members. It further ensures universal design, accessible technology, and co-ordinated public programmes and services. Given its positive direction, this approach requires government to provide the resources needed to implement these goals and to enforce penalties for those who refuse to co-operate (Surveys: Disability, Handicap and Society, 1992).

Thus far it is clear that the response of the disabled people's movement to their exclusion from the built environment has been the formulation of a social or socio-cultural model of disability. Having considered all the possible consequences, it has been found that this model views the environment (social and economic, as well as physical) as being responsible for the production of disability. This model is intended to undo what the individual and bio-medical models have imposed on disabled people. The proponents of social models of disability actively reject the 'personal tragedy' notion of random affliction championed by the Medical model. It makes clear the fact that anyone who falls outside certain culturally determined norms would always be referred to as disabled, or becomes categorised as disabled. Thus the

responses (political, social etc.) of society to a person's impairments cause disability rather than the impairments themselves.

The social model is in all aspects opposed to considering disabled people, regardless of their specific impairments, as a group, as this would lead to possible group oppression and exclusion by society. The response of a social model is shaped with the purpose of attempting to end the socio-political and physical environments which give rise to disability (Hurst *et al*, 1991).

It is not accidental that the built environment has become such a focus of attention within the disability movement, largely caused by the fact that the daily interaction of disabled people with the built environment is the major expression of their exclusion from society at large. Disabled people, through the social model, refuse to acknowledge the 'naturalness' of the built environment and the idea that it is simply an objective reality which must be negotiated by disabled people. Oliver (1996), for instance, argues that although 'walkers' (non-disabled people) are impaired in the ability to fly, they regularly do fly in specially adapted environments called aeroplanes. The argument is that, if environmental adaptations can be made to allow non-flyers (walkers) to fly, why shouldn't they be made to allow 'non-walkers' access to public spaces?

As mentioned above, in recent years, the social model thinking of the disability movement was dominated by two related strands which have important implications for the way people think about the built environment. These are the 'independent living' movement and 'minority groups' politics. The 'minority groups' model was originally developed to address sexism and racism, but its theories and philosophies could be applied with ease to any marginalised or oppressed group. Their approach takes the form of a radical politics of difference that has several ambitions and goals.

They are of the viewpoint that true justice should recognise the difference and diversity inherent in humanity. It is argued that a system of justice based on an abstract notion of 'humanity' or 'all citizens' will inevitably reflect the values of the dominant group, probably white, male, heterosexual and able-bodied (Campbell & Oliver, 1996). However, this dominant or privileged group is in fact only a small

minority of the population. Only by explicitly embracing difference can a system of justice be truly just. The minority group's model therefore calls for the rights of each individual to have, among other things, full access to the built environment on the same basis as other members of society. It asserts that a just society should ensure that these rights are respected (Campbell & Oliver, 1996).

The second group is the independent living movement which claims that it is a fundamental human right to lead an independent life. The movement embraces the fact that any environmental barriers which prevent disabled people from living independently should be removed. This would demonstrate the respect and recognition of this right (Morris, 1992: pp.157-166). This means that there should be other means improvised besides the current anti-discrimination legislation. Such legislation is supposed to be positive discrimination in favour of disabled people as a minority group. Given that things are not likely to occur automatically, few things have therefore to be taken into account, such as the availability of accessible and sensitively designed housing, accessible public transport and accessible public spaces and buildings (Oliver, 1996).

2.8 Conclusion

This chapter has highlighted various crucial factors in the field of disability. Those factors were informed by the concepts indicated above that acritical in making clear this discourse to the reader. Furthermore, after interrogating the two models of disability, it has been suggested that the medicalisation of disability is inappropriate because it locates the problems of disability in the wrong place, within the individual rather than in society. Indeed, once the true nature of the problems of disability are identified, it becomes clear that doctors neither have the skills nor the training to deal with them. Doctors and disabled people therefore are both trapped in a set of unsatisfactory social relationships. The only escape for all concerned is to jointly work on the problems of disability within the parameters of the social model which, while it does not guarantee a cure, nevertheless offers the possibility of developing a more fruitful relationship between doctors and disabled people. Three kinds of barriers have been highlighted - environmental, attitudinal as well as organisational,

and their impact on the daily lives of people with disability has been noted. It also became apparent in the chapter that amongst the two definitions of disability provided herein, the recent one is the most preferred, as it is considerably different and practical.

CHAPTER THREE

3. LEGISLATION AND POLICY

3.1 Introduction

In order to appreciate the root cause of the problem encountered by disabled people today, it remains crucial to examine the legislation that governs the manner in which activities meant for this group of people are conducted. Of greater importance, however, is that the legislation concerning disability rights and accessibility has to be considered within its historical, political and social context. In 1992, after a process of consulting disabled people and the organisations representing them, the Disability Rights Charter of South Africa was developed by Disabled People South Africa together with Lawyers for Human Rights.

This Charter largely emphasised the rights of disabled people to live independently. It was envisioned that South Africa has to provide within its available resources an environment that would in all respects ensure that society is free of every form of discrimination. Various Charters were developed by different disability sectors that attempted to deal with particular needs and concerns of people with certain types of impairments (SAHRC Report, 2002). What became apparent in all of these disabled sectors is that they varied in their disability but remained vocal and united in emphasising the heterogeneity of disability. The South African Declaration on the United Nations African Decade for Disabled Persons of 2000 also attempted to address concerns about how disabled people in South Africa were denied equal access to economic and social rights. In addition, it also highlighted the importance of self-representation by disabled people in all aspects of life in building an inclusive society that recognises the diverse needs and priorities of disabled people. A major role has been played by the 1996 Constitution of South Africa, which protects the rights of disabled people. However, there is still a need for further legislation that will replace discriminatory legislation so as to ensure that these rights are upheld and enforced in all areas of governments and society. In South Africa the constitution serves as the basis for progressive redress of the situation of disabled people by upholding the

values of human dignity, equality, freedom and social justice (Constitution of the Republic of South Africa, 1996).

3.2 International instruments

South Africa is a member country of the United Nations and a signatory to the United Nations Standard Rules on the Equalization of Opportunities for People with Disabilities of 1993. As a result, various organisations that deal with human rights, such as the South African Human Rights Commission, South African law and policy-makers, as well as organisations of disabled people, are guided by the rules that outline the minimum requirements that members of the United Nations must meet when carrying out their responsibilities to disabled people. One of the fundamental principles to be observed by the DPOs and other organistions, as well as the government, is the principle of equal rights that implies that the needs of each and every individual are of equal importance, that those needs must be made the basis when planning for societies and that all resources must be employed to ensure that every individual has equal opportunity for participation (United Nations Standard Rules on the Equalization of Opportunities for People with Disabilities, 1993).

The instruments employed to achieve this include:

- The International Bill of Rights which includes the Universal Declaration of Human Rights (1948)
- The International Covenant of Economic, Social and Cultural Rights (1966)
- The International Covenant on Civil and Political Rights (1966)
- The Convention on the Elimination of All Forms of Discrimination Against disabled people (1979)
- The Convention on the Rights of the Child (1989).

Finally, The World Programme of Action Concerning Disabled Persons as agreed for the UN Decade of Disabled Persons (1983-1993) provides a framework for action to create equal opportunities. The main purpose of the Rules is to ensure that girls, boys, women and men who are disabled are able to exercise the same rights and responsibilities as others.

In all societies there are obstacles that prevent disabled people from exercising their rights and freedoms to participate fully in the activities of their societies (Study for Anti-Discrimination Legislation, 1991). It should be the responsibility of states to take appropriate action to ensure that those obstacles are removed. However, disabled people particularly within their organisations must play an active role as partners in this process. The equalisation of opportunities for disabled people is a crucial contribution in the general and worldwide effort to mobilise human resources. In August 2002, a United Nations committee met to discuss the Comprehensive and Integral International Convention on Protection and Promotion of the Rights and Dignity of Disabled People. This initiative is being supported by the South African government.

3.3 The Constitution

The Constitution of the Republic of South Africa (Act No. 108 of 1996) is the supreme law of the Republic and "the obligations imposed by it must be fulfilled". The state is mandated to "respect, protect, promote and fulfill the rights of all people in the Bill of Rights". The Constitution applies to natural and juristic persons, as well as all law. It binds the legislature, the executive, the judiciary and all organs of state. The Bill of Rights (Chapter 2) specifically prohibits direct and indirect discrimination, by the state or an individual, against anyone on the basis of, amongst others, disability. This implies that denying any person his or her constitutional right on the basis of disability is deemed to be a violation of a disabled person's rights. Thus, according to the Constitution, discrimination against a person on the basis of one's disability is automatically unfair, unless it can be proved that the discrimination is fair. The responsibility to prove unfair discrimination does not lie with the disabled person. One of the milestones in the post-1994 South Africa is the fact that the constitution brought in a crucial aspect which is that of provision for affirmative action with regard to disabled people, in that it allows for measures to be taken to promote the achievement of equality for categories of persons disadvantaged by unfair discrimination as a remedy.

3.4 White Paper on an Integrated National Disability Strategy (1997)

The White Paper on an Integrated National Disability Strategy (INDS) was developed in November 1997, after a process of consultation and participatory policy formulation. The Integrated National Disability Strategy is formulated in such a way that it could serve as a framework from which a sound, integrated and comprehensive policy could be developed to address the social, economic and political inequities that exclude disabled people from mainstream society in South Africa. This document actually calls for a shift of approach, particularly on issues of disabled people, from the medical and welfare model to a human rights and equitable development social model (see chapter on Models of Disability). It champions a society for all which includes and covers human diversity as well as the development of all human potential. In addition to this, the ways in which disabled people were and are currently marginalised and disempowered are extensively discussed in the Integrated National Disability Strategy. The document is also critical in that it makes clear the necessity for policy-makers to understand how the needs and rights of disabled people are excluded from governance structures and processes. Central to this is the fact that, on gaining this sort of understanding, the relevant authorities would develop a transformation strategy that is more inclusive and comprehensive. The Integrated National Disability Strategy contributes largely through outlining key concepts that should guide government policy on issues concerning disabled people (White Paper on an Integrated National Disability Strategy, 1997).

Some of the key issues highlight how disability has generally been viewed within the medical or welfare approach which actually assumes that disabled people are sick and in need of support and help for them to be effective members of the mainstream society. However, the best approach is to view disability as a human rights issue and promote the social model.

An uncompromising stance of the Integrated National Disability Strategy asserts that society's mentality should change to better respond to the needs of disabled people. This means that though legislation could be made to address the issues that serve as barriers to the achievements of disabled people, it is still important to shift societal

attitudes in a more positive direction. This could be done through awareness programmes that change the attitudes and behaviors of individuals, thereby creating a united society that caters for diversity by excluding all physical and mental barriers that made this impossible before.

The Integrated National Disability Strategy further contends that disability issues must be integrated into all government departments, development plans and programmes. These should be done for the purpose of achieving full enjoyment of the right of people with disabilities, and ensuring that they fully participate in society. To this end, the Office on the Status of Disabled Persons (OSDP) was established in 1997, its main function being to co-ordinate, monitor and facilitate implementation of the INDS. In general, the function of the OSDP and its provincial disability units has largely been to encourage the equality of disabled people in South Africa by co-ordinating the disability-related programmes that should be considered in policies and programmes. Furthermore, the (OSDP) must ensure the proper implementation of the INDS by government which until now has been slow (White Paper on an Integrated National Disability Strategy, 1997).

3.5 The Promotion of Equality and Prevention of Unfair Discrimination Act (2000)

The Constitution of the Republic of South Africa, Section 9, provides for the establishment of an Act of national legislation that would prevent or prohibit unfair discrimination as well as promoting the achievement of equality. This means that there should be advancement by special legal and other measures, of people with disabilities as a historically disadvantaged group (Constitution of the Republic of South Africa, 1996). The Promotion of Equality and Prevention of Unfair Discrimination Act (Act No. 4 of 2000) was developed to meet this provision; the Act expands on the Constitutional stand that prohibits unfair discrimination and guarantees equality before the law. The Act plays a crucial role in giving effect to the spirit of the Constitution, in particular to the principles of equality, fairness, social progress, justice, human dignity and freedom. This has been made clear in chapter 5 of the Act which mainly focuses on the promotion of equality, and rules that it is the

general duty of the state to promote equality. The Act also states that the promotion of equality is the responsibility of people who are working in the public and private sectors. In actual fact, the Act has been clear in providing for positive measures that are important in making discrimination an offensive act as well as promoting equality with regard to race, gender and disability. This has a fundamental impact as its calls for the involvement of the South African Human Rights Commission as well as obliging all the state departments to take into consideration and implement policies that prevent discrimination in all state structures and programmes.

Discrimination is defined in the Act as being any act or omission, including a policy, law, rule, practice, condition or situation which imposes burdens, obligations or disadvantages on, or withholds benefits, opportunities or advantages from, any person on one or more of the prohibited grounds, which include disability and any other ground that might disadvantage a person, undermine human dignity or adversely affect an individual's rights and freedoms (Promotion of Equality and Prevention of Unfair Discrimination Act, 2000).

3.6 Accessibility and the built environment legislative review

The review of legislation concerning the built environment is critical in this report as it determines the extent to which people with disabilities and special needs are currently assured access to buildings and other facilities. The research report highlights specific legislative deficiencies and weaknesses in enforcement mechanisms, and indicates how the laws will need to be changed to protect the rights of these vulnerable groups in our society. The South African Constitution in 1996 and further progressive legislation based on its values have implications for the outdated laws dealing with the planning and development of our built environment. The existing laws around accessibility must be updated because people with special needs have the right to be equitably integrated into all aspects of society. This means, briefly, that they must be able to use public buildings and other facilities with as much ease, safety and convenience as other citizens. The Accessibility and Built Environment Legislative background provides an overview of the requirements. The

research report covers the South African Federal Council on Disability's Guidelines for the Built Environment and includes concerns raised by interviewees.

The South African Federal Council on Disability's Guidelines for the Built Environment provides a detailed evaluation of existing built environment legislation and policies, including:

- The National Building Regulations
- The Building Standards Act (1977)
- The South African Bureau of Standards (SABS) 0400 Code of Practice for the Application of the National Building Regulations (1990).

The proposed regulatory framework to ensure access for users with disabilities and special needs reflects the letter and spirit of the Constitution, thereby promoting a more inclusive and equitable society. Safe, healthy, barrier-free built environments must be the expected standard, not the exception (http://www.polity.org.za/govdocs/regulations/index.html). Special needs users are defined as people who are permanently or temporarily disabled, elderly, or using prams and pushchairs. Disabled users would include persons who are blind, partially sighted, and deaf or speech impaired, and those using wheelchairs or crutches.

3.7 The Building Standards Act (Act 103 of 1977)

This legislation was last amended in 1989; it is a central Act under which the National Building Regulations are made which makes it more valuable and crucial in the planning field. Its main purpose is to provide a framework that is more fundamental in administering all relevant regulations, and monitoring and enforcing them. The Act and Regulations must be viewed as interdependent, since excluding one might lead to a misunderstanding which could result in inaccurate and improper operations, which is not desirable at any stage or level of the project cycle (Building Standards Act No. 103 of 1977).

The National Building Regulations was initially developed by the Minister of Public Works in terms of Section 17(1) of the Building Standards Act. This Act's main

purpose is actually to make sure that all buildings are designed and built to be safe, healthy and convenient for users. This means that every building has to be built according to the standard set in this Act. Thus, it is envisaged that if all buildings could be erected in a □enalizes□at manner they will be suitable for use by various groups of users who otherwise would not have been able to use them (www.polity.org.za). This should be taken as an effort by the South African government to ensure that access is enjoyed by all citizens without experiencing unnecessary obstacles that would hinder their mobility.

3.8 The SABS 0400 Code of Practice

This is a non-statutory set of guidelines whose main purpose is to offer the required technical information necessary for the practical application of the National Building Regulations. The main point is that the legislation which has been developed to govern accessibility of the built environment has primarily relied on the application of one aspect of the Regulations, Part S, introduced in 1985 to address the needs of disabled people, albeit with limited success. Building legislation should be flexible so as to allow for innovation in the construction and building industries.

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It is easy to identify serious weaknesses in the current regulatory framework that deals with accessibility and the built environment, which include, amongst others, the following points.

The limited definition of disability fails to meet the specific requirements of differently disabled groups. The meaning of disabled has in the main been used to refer to physically disabled people. This, in turn, has facilitated the exclusion of other disability sectors from being considered. Thus, disabled sectors are not offered equal treatment before the law which has undesirable consequences. In fact, almost all the costs and benefits of the built environment are measured in terms of the needs of the physically disabled group, to the possible exclusion of other groups.

Another deficiency is caused by the fact that there are loopholes for property developers as well as building professionals that make it possible to evade or ignore

accessibility requirements. This is mainly because the non-statutory guidelines of the SABS Code of Practice are not legally enforceable. This should be amended to promote compliance (Abberley, 1998: pp 5-19). The lack of supervision and monitoring could be regarded as the central problem in South Africa which the relevant authorities must rectify, as it has negative consequences for the groups that are excluded.

Such lack of enforcement is a challenge especially when considering Part S of the National Building Regulations. This has resulted in the majority of public buildings in South Africa being inaccessible, which should be understood in terms of its negative consequences. For instance, the fact that the built environment is inaccessible reinforces the very stereotypes and attitudes that the Constitution aims to avoid, and indicates that planners and architects continue to construct buildings that are not accommodating of the diverse groups in South Africa (Zarb, 1995).

A further concern is the failure to cross-reference Part S with other relevant sections of the National Building Regulations as required, resulting in deficiencies and loopholes, irregularities and misconceptions in the application of such regulations (Government White Paper on Disability). In essence, the weakness and limitations of the legislature have serious implications that, if not effectively dealt with, will result in the constitutional mandate remaining unfulfilled.

However, Part S of the National Building Regulations largely provides for those physically disabled people who use wheelchairs. Approximately 25% of people with disabilities have impaired mobility (StatsSA, 1996). This is why 75% of disabled people are not accommodated satisfactorily in the current building regulations. The Building Standards Act No. 103 of 1997 was developed as a contribution to a barrier-free built environment. This Act's main purpose is to provide for the promotion of uniformity and □enalizes□ation in the law concerning the construction of buildings in the areas that are controlled by local authorities. Thus, the main function of this law was to play a central role in prescribing the building standards as well as dealing with related matters. The deficiencies that can simply be identified in this Act and its enforcement mechanisms include:

The lack of reference to the Constitutional rights to equality and dignity which require accessibility for disabled users and special needs. This is a very crucial issue as the omission of the Constitution simply means that it has not been considered in the formulation of this Act. It is necessary for every policy in South Africa to reflect the norms and values of the country by making reference to them.

The exclusion of the State and other relevant stakeholders and interested and affected parties from the building plan evaluation process makes it difficult to rectify the mistakes. It is important to ensure that whenever buildings are constructed the relevant knowledge is gathered that could be useful in giving guidance as to what should be included and what not. This level of participation could serve as an essential contribution that would ensure that the building guarantee the inclusion of all the users (http://www.sahrc.org.za/towards_barrier_free_society.PDF).

The inadequate measures for safety, health and accessibility in the built environment are cause for concern. It has become common knowledge that the built environment is not suitable for use by disabled people and unless these problems are addressed the built environment will remain unusable, and render the Act useless (http://www.sahrc.org.za/towards_barrier_free_society.PDF).

There is no assurance that the rights of all users of a built environment are upheld when Ministerial amendment of any National Building Regulations is made. As the inability of the disabled people to use the built environment is taken as normal and accepted, the relevant authorities are also less vocal about what should be done in order to improve the conditions of disabled people through the adjustment of the built environment (Surveys on Disability, Handicap and Society, Vol. 7 (2), pp 139-55). Thus, most of the disabling factors that are found in the built environment are taken as unchangeable and require some degree of personal transformation.

A further concern is that the rights of all users of a built environment, including the disabled people, are not upheld when new by-laws and regulations are enacted by local authorities, subject to approval by the Minister (Disability, Handicap and Society, Vol. 7 (2), pp 139-155). This is in spite of the fact that the Integrated Development Plan (IDP) makes provision for community participation that should

lead to effective and constructive contribution by the public for service delivery in their interest.

The limited law enforcement of the SABS Code of Practice for the application of National Building Regulations is also part of the weakness. The Act that guides or regulates how people and government bodies should conduct their business needs to be regulated by strong government. The lack of this aspect leads to deficiency and undesired shortcomings, especially if there is no penalty for non-compliance. This would affect the standard of the built environment that aims to be diversity (http://www.dpsa.org.za). It is therefore crucial for the government to establish a monitoring body that evaluates the progress, serves as an advisory council and □enalizes non-compliance.

3.9 The National Building Regulations and the South African Bureau of Standards 0400 Code of Practice: further issues

The National Building Regulations were originally introduced as a long-term anti-inflationary measure, which would not increase the cost of building. Regulations were kept to a minimum and, as far as possible, were only concerned with the health and safety of persons in a building. Technical regulatory aspects are covered by the functional regulations of the SABS 0400 Code and aim to assist, rather than impede, the use of innovative building systems and designs. Prescriptive provisions in the Code attempt to satisfy the technical requirements of the National Building Standards by setting out possible ways of complying with functional regulations. Where considered necessary, illustrations and commentary amplify these provisions to promote better understanding. In its commentary on the regulations in Part S, "Facilities for Disabled Persons", the Code states: "Where provision is made at the design stage for the necessary facilities within the building, any increase in cost should be minimal" (South African Human Rights Commission).

However, the researcher has been able to identify other problems in most Parts of the National Building Regulations and SABS guidelines, including Part S. In particular Part S cites:

- Inadequate administrative enforcement mechanisms for the approval of public building plans that have resulted in the majority of public buildings being in contravention of regulations.
- Deficient regulatory measures that fail to ensure public safety and fire protection for persons with disabilities.
- Insufficient definition of the specific requirements for particular disabled user groups. Provisions are primarily for disabled users in wheelchairs and those for other users with disabilities are frequently ignored and seldom enforced by local authorities.
- International symbols must be clearly exhibited to indicate the existence of, and directions to, facilities for users with disabilities.
- Potential misinterpretation of the terms "suitable" and "sufficient" in certain sections.
- Ambiguity in specifications and the absence of cross-referencing Part S with other sections, resulting in inconsistencies and misinterpretation.

The Legislative Project also recommends that some of the technical specifications for building accessibility in SABS Code 0246 be incorporated into SABS Code 0400, as the former does not form part of the legislature governing the built environment.

The SABS Code 0400 is a non-statutory document and therefore not legally enforceable. This is a serious shortcoming. Mandatory compliance should be required of local authorities to promote enforcement of its specifications. Emergency escape routes must accommodate wheelchair users; deaf people require visual emergency signals, while blind people need audible ones. Alarm activators, mobile fire extinguishers and escape route bolts must be accessible to wheelchair users and short people. For example, tactile surfaces and cane detection areas assist blind people in independent movement within built environments.

3.10 Conclusion

In this chapter the writer has tried to outline South African legislation that informs issues pertaining to disability. In reality, South Africa has one of the most progressive,

rights-based constitutions in the world. Yet citizens with disabilities are daily confronted by barriers that prevent them from fully participating in society. People with disabilities continue to be systematically denied equitable access to their rights. Their situation in life becomes even more difficult due to societal neglect, discriminatory attitudes and barriers in their communities. The legislative review of accessibility and built environments has largely focused on the physical barriers people with disabilities face in society. There is an acknowledgement by various stakeholders of the need for a full investigation into other discriminatory areas, including communication, information and technology.

As indicated in the report, government's Integrated National Disability Strategy is a landmark policy document in the struggle to create a just and equitable South African society. It needs to be supported by legislation that guarantees the rights of people with disabilities, covers all aspects of their lives, and opens up equal opportunities for them to realize their social and productive potential as citizens. This report has highlighted the fragmented nature of existing legislation to protect the rights of persons with disabilities. The various and disjointed laws and regulations with codes, standards, sections and guidelines make enforcement and monitoring difficult. An alternative to further piecemeal amendment of the current legislative framework is to create one comprehensive South African disability act. In this way, the rights of people with disabilities may be promoted in a more coherent and mainstreamed way.

Legislation and policy provide vital tools for creating a just and equitable society, and giving full effect to our constitutional values. However, legislation alone will not address inherent and deeply entrenched social neglect, which requires both political will and individual social commitment. In all sectors, planning and budgeting processes must accommodate the needs and rights of people with disabilities. The process of developing new strategies, laws and regulations must include people with disabilities as equal partners. All decision-makers, such as government officials, legislators, employers, architects, property developers and others, have a constitutionally mandated responsibility to remove barriers that prevent individuals with disabilities from enjoying their rights. It is hoped that this report will add value and impetus to the process of making society more inclusive of people with diverse abilities and needs.

CHAPTER FOUR

4. CRITICAL ELEMENTS OF THE BUILT ENVIRONMENT

4.1 Introduction

In this chapter various elements of the built environment are discussed, as well as their impact on the daily experiences of visually impaired people, particularly when moving around. Amongst others, the elements that will receive particular attention include: landmarks, edges, nodes and path. These elements are of great importance as they play a central role in dividing the environment into smaller, clearly connected and more manageable sections that could be directly encoded into a hierarchy of spatial knowledge.

The chapter will proceed to explore a variety of challenges that visually impaired people encounter when navigating the built environment. This information is fundamental in obtaining a broader and deeper understanding of the way in which various designs, policies and strategies hinder their independent movement and developing approaches to ensure that visually impaired people are not further excluded in future designs of the built environment. Most of the concepts used in this chapter emanate from the writings of K Lynch, who explains in 'Image of the City' in 1960, that "various people hold a particular image of the city which is based on how they differently experience and perceive it on daily basis". It is these varied images that are crucial for one to be able to operate successfully and encounter as few problems as possible when using the built environment and interacting with his fellows. In this regard it should be considered central by planners that the prime factor when dealing with issues regarding urban planning, is to ensure that the design and form of the city constantly makes sense to its users and continues to convey relevant meaning. For the purpose of this research report, four types of elements are considered useful in the daily interaction with the built environment and reinforce experience and perception of the city form and its image.

The four elements as referred to above are paths, edges, nodes, and landmarks. It would be very interesting to have an overall understanding of visually impaired people's own experiences of how they interact with the built environment as well as problems encountered in the process. Attention would in this particular case largely focus on the urban environment. In essence, the crux of this chapter is based on visually impaired people's experience of urban and other landscapes originally designed with the sighted community in mind. It should be taken into account that this experience is disrupted and transformed when there is a new or additional layer within those spaces. The city is made up of various images: a physical layering; a complex layering of history which is composed of elements of many hundreds of years of history that contributes to image; and finally, a layering of forms of experience, such as religious, secular, commercial, civic, personal, and more.

Kevin Lynch has in most of his literature explored the question of the urban environment as experienced by people who occupy it. Lynch speaks of the image of the city, not questioning a city itself, but studying people's mental maps of the city as they encounter it. The prime fact to note here is that different cities are more likely to resemble and convey different meanings to different people, and are thus loosely defined in terms of their characteristics as well as parts or sections, such as regions, paths, landmarks and networks. This is an interesting perspective that explores the form of the city as a consequence of one's actions. It is essential that the ways in which visually impaired people interact with space which is structured in the way that prompts one's mind and encourages action be thoroughly explored. This could result in many different ways of seeing coupled with the varied ways of experiencing the city by different people (Dube 2005).

Another author, who, like Lynch, contributed to this discourse, is Smail, who tends to explore the emergence of a primary aspect of people's experience of urban settings - for example, street addressing as a form of reference. Smail believes that there are three competing forms of location identification. "The first is a form of navigation by regions and neighborhoods which concentrates more on informal understanding of the city in terms of the people who live there, the work they do, the churches they attend and so forth. The second is a form of navigation by landmarks, for instance, squares, statues, churches, civil buildings, and so forth. The third is based not on streets but on

what the author would refer to as islands, and would generally be understood as city blocks" (Dourish and Bell 2007). It is interesting to note that the view of islands seems to shade the entire experience of the city as it is made up of businesses clusters not on streets, but on islands. For instance, islands could be useful in pronouncing the use or function of that particular area, for example, the island of the shoemakers, or fish merchants, etc. Conversely, Lynch talks of the ways in which people imagine cities, but the way in which these imaginings take place differ from our own, and really condition our experience of the city. On the other hand, Smail has focused on the idea of streets as the primary way in which location should be described. (http://www.ics.uci.edu/jpd/talks/berkeley-urbantal, November,2005).

It is noteworthy that, in most cases, whenever people try to find a way around the city, or urban area without street names, that alone becomes a crucial experience of the form and structure of a city. When a city lacks things like street names it is usually encountered, imagined and perceived as a different set of structures and opportunities for action. To put it more simply, cities are a layering of street infrastructure (signage) and other infrastructures that define elements of the city. Thus, "the naming of streets is an infrastructure for encountering and experiencing the city. Street naming defines patterns of sameness and difference that defines what one sees when she/he looks around (Dourish, 2004)". At the same time, people have many different infrastructures that define their experience. Transportation systems are an obvious example. What becomes more important here is an understanding and experience of the city as a continuous phenomenon. Traffic flows, parking patterns, regions and neighborhoods, which are all infrastructures, shape one's experience. The central argument here is that spaces have structure and meaning for people. These meanings are informed by, and are result of, how we understand and relate to a variety of infrastructures that trigger action and people's interpretation of urban environments. This leads us to a more conclusive perspective of seeing and understanding architecture as being all about boundaries and transitions and their intersection with human and social practice (Dourish, 2004).

Architecture has thus a pivotal role to play in way-finding process. In the process of way-finding, the strategic link is the environment image, the generalised mental picture of the exercise physical world that is held by an individual. This image (a

mental picture held by an individual), is the product both of immediate sensation and of the memory of past experience. It is more important for interpreting information as it is the one that is crucial in guiding or giving effect to action (Popplestone R (2002). The need to recognise and pattern our surroundings is central in our daily lives, and the image of the city borne in our minds has more practical and emotional importance at the individual level.

Obviously a clear image enables one to move about easily and quickly, to find a friend's house or a police station or a store. But an ordered environment can do more than this. It may serve as a broad frame of reference, an organiser of activity or belief or knowledge. On the basis of a structural understanding of the city, one can order a substantial quantity of facts about the nature of the world we live in. Like any good framework, such a well-structured city gives the individual a possibility of choice and a starting point for the acquisition of further information (Howell, Chalklen (2003). A clear image of the surroundings is thus a useful basis for individual growth. A vivid and integrated physical setting, capable of producing a sharp image, plays a social role as well (Lynch K. 1960).

4.2 Paths as a critical element

First, it is vital to offer a general definition and description of what should be understood to be a path. Paths are the channels along which the observer usually moves, such as streets, walkways, transit lines, and railroads. In general, when people move in these paths that actually plays an important role in guiding them, they eventually acquire and encode the knowledge of city form as they perceive it (Houston (1997). Durban: Praxis Publishing.

In essence, paths are mainly used to give the city a shape or order, hence they should have a specific quality through which they can be identified and be used to mark them off from their surroundings. According to modern aesthetic theories rooted in the tradition of Immanuel Kant's Critique of Judgement, it suggests that the experience of art does not rest on dispositional properties inferred by the beholder, but on properties which are directly given in an object, and are thus accessible to immediate perception.

Properties accessible to immediate perception could be some special characteristics that may be important in more than one way, for example, anything that could have concentrated there, with a special use that can show that there is an activity going on, albeit at the edge of the street. A spatial quality of some kind can also be important and useful, for instance, a special texture of floor or the way in which the lights are organised to give meaning to that specific surrounding. However, it is a necessary condition that these spatial qualities fit to each other as they must give continuity to a path and it is only if one or more of these parts is well-arranged and connected to each other that the path may be imaged as a continuous, unified element (Lynch, 1984). The continuity displayed by spatial qualities is also crucial for visually impaired people who do not use sight for exploring or navigation. However, for these qualities to be recognisable, aspects like texture as well as light of various colours and shapes for differentiating different spaces is highly recommended.

Some of the important things that can be used to make sense of the path are a line of planted trees with different lengths and shapes, or a specific colour or texture of the pavement. The lined trees, with various shapes and sizes, create a shade that is perfectly usable as it could easily be identified by visually impaired people. This is known as a visual hierarchy of the streets and ways. The term largely applies in situations where a person is able to single out some of the things that are helping him/her by giving meaning that is ultimately used to build and structure a perceptual image of path (Jansson, Fanger, Konig & Billberger, 1998). Essentially, the characters of the path are more effective if they are able to give a line of direction that is clear to the visually impaired user. This is more important because the visually impaired person's capacity of memorising the spatial environment depends on them. In some instances, the memorisation process is more likely to be disturbed if there are many successions of turning or by gradual and ambiguous curves that produce major directional shifts without communicating (Lynch, 1960).

In general, it has been found that trees best serve their purpose in such instances, particularly because they are normally used by visually impaired people, especially those who are totally blind, to find directions and for identification of different places. Their usefulness is further deepened by the fact that they are more identifiable if they are in open spaces where there are no other things close to them that could shade them

or undermine their visibility. The manner in which these trees are put to use by visually impaired people is determined by the ability to identify such a tree when her/his senses are prompted. That is, a visually impaired person would use her/his senses to spot that particular tree which then serves as a mark that indicates if one has reached the required section (Foulke & Berlá, 1978). It is also important to note that detecting that particular tree does not (as in other cases), need one to have a physical contact with the tree but rather, one has to be at a reasonably close distance to sense its shadow. The senses are, under normal circumstances, activated or triggered whenever anything is approached, so if a visually impaired person is travelling in a straight path this should be easy to do. According to Henri Bergson (1977), there is an inherent suggestion of action in images of architecture, which is the moment of active encounter or a promise of use and purpose. Thus, the environmental surrounding reflects its possible action upon the user. This bodily reaction is an inseparable aspect of the experience of architecture, as a consequence of this implied action. A meaningful architectural experience is not simply a series of retinal images. The elements of architecture are not just visual units, they are by nature confrontational as they cause as well as respond to the surrounding features.

A street that is easier to use is the street that leads the traveller towards a specific place. Therefore, the path should be able to give the user the sense of progression through different shapes, slopes where one can feel that she or he is going high or low without losing the direction. Thus, it is equally important that when a visually impaired person is travelling she/he has the sense of arriving or of being able to tell if the targeted point has been passed (Dodds, 1982). In such instances, several checkpoints become more important in order to improve understanding or knowledge, for example, of a quality such as the space of the corridor, which can have a different sense of the physical environment at a changing rate, so that the change itself can be simply or easily recognised. In this way it is easier for a visually impaired person to know that a specific place is just before the street narrows rapidly and such a person can travel with confidence. This may, however, be disturbed by some interruptions. For example, visually impaired people become spatially confused, lost or disorientated for two main reasons. The first is called 'self-produced' confusion which is spatial confusion caused by the misperception or miscognition of a route, for example, miscounting intersections. The second one is called 'situational' confusion

which is a spatial confusion caused by a permanent or temporary localised occurrence such as roadworks, vehicles parked on pavements, and street furniture (Butler & Bowlby, 1997). In general, both these types of spatial confusion cause feelings of fear and anxiety that lead to a loss of self-confidence and frustration, which in turn could lead to less independent travel and exploration, and the development of constrained patterns of spatial behaviour (Passini, Proulx & Rainville, 1990).

Despite the possibilities that are more likely to disturb a visually impaired person's navigation ability, a visually impaired person can also gain route knowledge by becoming aware of the context of the environment. This means that, when following a familiar path when one looks right or left, she/he should be able to notice anything that may be identifiable, such as a road that runs parallel to the path followed. In many cases, in order not to complicate the journey, particularly in unfamiliar routes, following a specific route could also require that a visually impaired person should have stood at a junction making a decision to go either right or left or straight. This makes the junction a decision point. Another way to acquire route knowledge can be through joining sections of two or more known routes into a new route. Finally, route knowledge can be acquired by use of a street map (Maurer & Séguinot, 1995). Unfortunately, it is more difficult for visually impaired people to use maps or even use things that are at an unwarranted distance for navigation purposes, or reading the physical environment. What could be more useful for visually impaired people in such cases is any sound that might be caused by a permanent establishment, for example, water pool, electronic generator, the sound made by cars passing by or any smell that could be regarded as permanent (Bryant, 1982). Furthermore, if a visually impaired person is walking on a road that she/he is used to, being close to a permanent object such as a bin or staircase could assist in making the decision to turn right or left.

Under normal circumstances, the presence of the path may be made obvious by high landmarks along it or other hints. The most important line of movement can become the symbol of a fundamental urban function. It thus remains imperative to always keep in mind that the city is made up of the organised paths that form the structured set of where the intersection should be, that helps to guide the mover, as this is where the mover is to make the decision to turn or to move forward. Other senses come into

play assisting each other in ensuring that the perception of the path is clear. Thus the spatial distinction between streets could easily be recognised visually if there are characteristics like colour, planting, etc. Nonetheless, this does not mean that they can only be detected by eyesight, as they could just as well be detected by other senses, particularly in a visually impaired person. Also necessary in ensuring that there is a logical framework that makes for better recognition of paths and streets, though not for use by the visually impaired, are naming and numbering, and topography (Kitchin, Blades & Golledge, ,1997).

It is possible, however, for a visually impaired person to employ certain tactics necessary for navigation in exploring the surrounding physical environment that could be open or enclosed. For instance, one could navigate networks of routes in order to get a better understanding of route connections and paths in general. It is throughout this navigation process where the basic navigation tactics are actively applied, especially if the route taken becomes complicated by various routes that emanate from it, thereby creating a myriad of paths (Kidwell & Greer, 1973). Usually when a person reaches the end of the path he experiences a junction which in most instances serves as a decision-making point. It is at this point where a person has to make a decision with regard to where she/he is heading; however, the decision would chiefly be informed by the direction at which this junction is approached, which would then lead to choosing a path to be taken. The final decision to follow a particular route, path or passage is taken, having considered various factors fundamental to such decision-making processes, for instance, landmarks like outstanding visual objects, particularly when they are constant or even fixed (Brambring & Weber, 1981).

Kant (1970) championed the subject-object relation by arguing that we cannot know the actual form of an object, only how it appears to us. Thus form is a construction of the mind based on prior principles of sensibility by which the manifold of sensations is organised into specific patterns. His position presages contemporary organism-organisational positions in psychology, which state that stimuli organise themselves into forms on the basis of innate preference of the human perceptual apparatus. In laying the foundations for modern aesthetics, Kant defines as aesthetic all judgments that are of a non-anteleological character, that is, all judgments executed in a mode of direct awareness. This is true with visually impaired people, because if the decision of

choosing a route amongst others has to be taken by a visually impaired person, the cognitive process would be more similar to that of a sighted person. Nonetheless, a visually impaired person would have to experience the physical part of the boundary and other spatial qualities that are necessary and instrumental in decision-making at such points. This would include listening to, and judging where different sounds come from, the changing ground texture, the direction of the blowing wind, or the shape of the pavement. In essence, a visually impaired person should always keep in touch with the tools that help him get to that certain point for such a person to make a well-informed decision. Losing a guideline would mean losing a direction, and for such a person to get back to such a guideline might mean going back to the start or using a trial-and-error method, which is where one would try other various techniques for reclaiming his or her original position (Miller, 1983).

4.3 The meaning of edges to visually impaired people

According to Bachelard (1966), an architectural space plays an important role in that it frames, halts, strengthens and focuses one's thoughts, preventing them from getting lost. An architectural space is also used by visually impaired people whose experience is more practical when interacting with borderlines or boundaries. In fact, it is difficult for visually impaired people to cross unaided depending on the width of such edges. However, edges are an important part of the built environment and need to be designed in such a way that they remain visible and recognizable (Community Agency for Social Enquiry, 1999). Like paths, edges are more likely to be difficult to identify or recognise if there is no continuity of form. In essence, for the edge to best be useful, one must be able to recognise its visibility from a distance. Alternatively, an edge should be placed where it marks a very important busy area, and must be easily able to identify, show or reflect the boundary where two regions join each other clearly. Whenever there are two different areas that have to join each other and their meeting edge is laid open to view, they can easily attract the visual perception (Lynch, 1984). However, an addition of sound, or change of texture can be of advantage to people who cannot see.

The bounded regions that do not necessarily reflect any difference or a symbol of boundary pose a serious challenge and remain more problematic to the visually impaired user. It is thus crucial for a visually impaired person to be able to make a distinction between various locations to orientate themselves or be oriented with ease (Community Agency for Social Enquiry, 1999). For the purpose of ensuring that various regions or areas are distinguishable, particular kinds of visible hard materials that could be identified by a white cane could be used to mark various sites especially the barrier line; or by plants and/or through the shape of the edge which can give orientation along its length, as well as identifiable points at intervals (www.independentliving.org/docs1/hr6.htmlNovember 2005).

It is also possible for an edge to serve more than one purpose and be more than just a barrier. This largely happens if visual or motion penetration is allowed through it. In essence, it makes an edge to take the form of a joint rather than just a barrier. That is, besides being a buffer, it symbolises a line of exchange along which two areas are joined together. In most instances, where many visual and circulation features are connected to the structure of the city, they tend to act as features that arrange everything in order. As mentioned above, for the edge to be visible, and for it to be visible to a visually impaired person, accessibility or use must be increased. (www.independentliving.org, November 2005). These various characteristics however, may mean nothing to visually impaired people if visualisation is over-emphasised above other senses.

Of importance here is the meaning of visibility to visually impaired people as opposed to how it is understood by the sighted community. For an edge to be visible to visually impaired people, it must be rendered visible through a curving pavement that does so consistently over a long route distance. That is, it is necessary for the pavement surface to demand attention for the purpose of assisting a visually impaired person who is heading towards the edge or is already there (Popplestone R (2002). Even though an edge acts as something more than a barrier to sighted people, for visually impaired people, an edge only resembles a boundary, and only takes the form of a joint of all other things once a visually impaired person interacts with the whole environment. This means that the other meaning, which is that of a joint, only emerges during the process of crossing the street or taking a corner. Nonetheless, it is

still possible for one to have an understanding of an edge that is a distance away, but this sort of understanding would at that particular moment be less helpful or even inadequate to inform any decision. Ideally, a visually impaired person could possess the knowledge of the presence of an edge even if not at that particular place; even when not in the physical space, it remains in the person's thoughts (Popplestone R (2002).

4.4 The role of landmarks in decision-making by visually impaired people

Landmarks are another type of point reference that can be used moving through the space, but the observer does not enter within them. Unlike other references discussed above, landmarks are more external by nature. They are definable in simple terms as physical objects – for example, building, sign, store, or mountain (Weinfeld, M., (1981)., When these landmarks are used one has to single out one element out of many possible elements, where some are more visible than others. These landmarks could be in the cities and are mainly used for practical reasons. The best example would be an isolated tower, or a hill. Even a mobile point like the sun may be employed, provided one has a clear understanding of direction in general (http://muse.tau.ac.il/publications, April (2005).

Despite the importance of the abovementioned types of landmarks, they remain less useful to visually impaired people. For a visually impaired person to use or view something as a landmark, it should be in a position where it may be reached with ease. Berkeley Hegel (1995) claims that the only sense which can give a sensation of spatial depth is touch, because touch senses weight, resistance, and the three-dimensional shape of material bodies and thus makes us aware of things extended away from us in all directions. In general, the most useful landmarks are primarily local and they can only be viewed from certain positions as they are restricted, for instance, the innumerable signs, store fronts, trees and other urban detail, which fill in the image of most observers. In the main, landmarks are used as clues of identity or structure and are relied upon once one gets used to them (Psathas, 1970).

The important characteristic of a landmark is the singularity, its context or background. It may be a bright surface in a street, or a church among stores. Its spatial distinction particularly grips one's attention. As indicated above, landmarks are sometimes signs that are restricted to specific surfaces, or height limits which apply to all but one building. In addition, if such an object has some richness of detail or texture, it surely would invite not only the eye but also other relevant senses applied by visually impaired people (http://musc.tau.ac.il/publications, 20 April 2005).

The central purpose of landmarks cannot in any way be undermined as they are more useful in maintaining one's sense of direction. Notwithstanding all that has been referred to in this section, landmarks can be taken advantage of differently by visually impaired people. For instance, a structure that is more distinguishable or identifiable because of its position becomes more essential and could serve as a landmark if a visually impaired person knows about it, regardless of not seeing it (Passini, Proulx & Rainville, 1990). This means that since it is impossible for a visually impaired person to view such structures from a distance; their existence can only be thought of, rather than physically seen. In fact, what happens in a process of route navigation is that various streets and other relevant structures are connected to one another and give life to the structure that serves as a landmark from a distance. For example, it is simple to know that after the traffic lights, there will be a church ahead on the left. However, it is almost impossible for a visually impaired person to identify or use anything to their advantage, if it is not connected to others, particularly if it has to serve a landmark purpose (Franklin, Tversky & Coon, 1992).

It is also important to note that things that are considered as landmarks by sighted people might not have the same meaning to a visually impaired person. For example, a mountain that could be viewed at a distance could not serve as a landmark because one might not be able to physically interact with such a mountain in any way, and as such its existence might not even be realised or known. However, a bottle-store that is always busy, a primary school at the corner, a huge water-pool or a river with flowing water, a filling station/petrol garage amongst others could serve as a landmark to a visually impaired person (Saunders, P., (1981). The visibility of such structures does not depend on the archetype but rather on texture, sound, smell, the frequency of contact, shade, and the connectivity ability of such a structure with other structures

close to it. According to Levin (1977), the sound of church bells echoing through the streets of a town makes people aware of their citizenship. The echo of steps on a paved street has an emotional charge because the sound reverberating from surrounding walls puts us in direct interaction with space. The sound measures space and makes its scale comprehensible. One also has to emphasise that a landmark could not be used by a visually impaired person who had never had physical contact with a certain space (Sholl, 1987).

A positive shift would be to arrange landmarks in a continuous sequence for the journey to be more comfortable through a familiar succession of detail. According to Bachelard (1985), a special joy of travel is to acquaint oneself with the geography and microcosm of smells and tastes. Every city has its spectrum of tastes and odours. Sales counters on the sidewalks are appetising exhibitions of smells. Landmarks are better valued when grouped together in patterns, which in themselves have form, and may indicate, by their appearance or scent of their products, the direction from which they are viewed. This makes it simple to notice landmarks even if a visually impaired person is at a distance and can easily use them as a source of direction (Butler & Bowlby, 1997).

Despite all the information provided in this section, more is needed if visually impaired people have to freely use the built environment with particular reference to landmarks. As mentioned above, visually impaired people depend on their various senses for decision-making that concerns the use of the built environment. Even though not everything can be changed to suit these groups of people, most of the things can be adjusted and future designs could take into consideration such things as texture, sound, or exclusive colours that can be used to differentiate two different building or places that are in the same area or close to each other, and materials that are used for various structures (Fraser, N., (1996).

4.5 Spatial performance at junctions by visually impaired people

The urban environment is designed to include strategic points wherein an observer can enter. These strategic points vary depending on where they are located. In some instances, they display themselves as joins where a break in transportation takes place, a crossing or where paths converge. This is in general where the shift occurs from one structure to another and is referred to as nodes. In other cases, the strategic points could be recognised by their use as a concentration site, for instance, a street corner. Most of the concentration nodes are used as a focal point or a centre while also operating as districts. In essence, many nodes contribute as both junctions and concentrations at the same time (Lynch, 1984).

Nodal points could also be more visible if they are able to create a specific perception that would continue to support its identity as well as being distinguishable. Of importance would be the remarkable and continuous quality of the walls, floor, lighting, vegetation, and topography (Kitchin, Blades & Golledge, 1997). In essence, orienting oneself in an environment and moving around rapidly, efficiently and independently is a difficult task, which depends upon a series of processes of relatively high cognitive complexity, including the perception, coding, learning and recalling of spatial information (Kitchin, *et al*, 1997). It is therefore crucial for nodes to be user-friendly in such a way that orienting oneself is easy.

However, the opposite is the case when considering nodes, as they consistently serve the visually impaired community adversely. For instance, the double identity that is displayed by the nodes is not effective for visually impaired people who are likely to be confused by the very use of such nodes. The disorder so admired by sighted users poses a threat to a user who is visually impaired because using a cane demands use of either the far right or left part of the route. As a result of being forced to use the margins, visually impaired people are then forced to depend on sighted people for help. Thus, all the characteristics that are meant to be to their advantage remain unhelpful for visually impaired users (Gorman, 1998).

The strength of the node's identity is derived from the fact that it is a distinct, unforgettable place, and impossible to be confused with any other element. The continuous use of the nodes also strengthens the identity that enforces the distinctive visual shapes. A well-known characteristic that can be used to define nodes is a sharp,

closed boundary which should be traceable with certainty. These kinds of nodes are likely to be more remarkable, if provided with one or two objects which attract attention. The joint between path and node must be visible and easy to read, especially intersecting paths. For nodes to give more meaning to the user, the traveller must see how he/she enters the node and where the break occurs and also how to go outward (Lynch, 1960).

With regard to visually impaired people the node is less useful in that, because it is large, it tends to confuse visually impaired people. If a visually impaired person is positioned in an open space, he/she gets confused and loses direction, especially if the marks that should be used for guidance are more visual or at a distance where one cannot touch, feel, or sense their availability (Skory, 1995).

A node can have a relationship with the whole city network if it has a local orientation. In this way the user can feel the presence of the city structure around them and would also know in what direction to move to reach a goal. Thus, the distinctiveness quality and character of the place is more recognisable if it makes the user feel how it varies from other areas (Park, Radford & Vickers, 1988). The quality of being dissimilar from other areas is a good quality that should be enforced in all other places as it makes it simple for the visually impaired person to know and understand where he/she is, if other senses could be applied than sight. That is, if places differ from one another, it informs a visually impaired person where he/she is heading to without asking for assistance from other people. However, if this distinctiveness is enforced through making the node a centre where a variety of things takes place, it becomes difficult for a visually impaired person to navigate independently (Park, *et al*, 1988).

Visually impaired people would be able to understand and use the nodes if certain factors could be taken into consideration when designing and maintaining them. Firstly, it would be advisable if the boundaries at the far right or left part of the nodes are made to suit visually impaired people, through ensuring that there are small walls with the height of a knee degree. These are the walls that guide visually impaired people as they would stay close when using a cane to navigate. Secondly, street hawkers should restrict their goods to designated areas to allow free passage. Thirdly,

at every point where people and cars cross, must be made to be recognisable by using different textures, or a wall of different size, or a pavement of different shape and or, ramps (Moore, 1988).

4.6 Conclusion

This chapter outlined a built environment suitable for navigation by visually impaired people in particular and people in general. An inclusive city as envisioned in this report is supposed to be imaginative, well-formed, distinct and remarkable. The advantage of this type of city is that it is easy to move within, as the visually impaired person as well as their sighted counterparts would be well-oriented. This, however, could not be discussed in isolation, so in discussing the characteristics of such a city four elements were included - paths, edges, nodes and landmarks. In general it was recommended that for these elements to be useful in helping visually impaired people in navigating the built environment, some components need to be added, adjusted or even removed altogether. Issues affecting visually impaired people navigating the built environment with a cane were presented, as well as explanations of how poor town planning and design can impact. In addition to the cane, visually impaired persons apply their various senses like hearing, touch and smell. The implication of their condition is that instead of seeing something at a distance a physical contact at best has to occur. Furthermore, for the purpose of effective use of these senses and the cane, some modifications on the built environment would be required, such as, for instance, some sort of paving that could be differentiated from the rest of the surroundings, whether by shape, size or texture. This sort of design is critical in helping a visually impaired person to locate her or himself. Trees could also be useful if they are not planted close to each other (that is, with sufficient space between them), the degree of flatness of the floor, various colours that are easily identified, or lights.

CHAPTER FIVE

5. FUNDAMENTAL QUALITIES OF LOCALITY FOR OCCUPATION

5.1 Introduction

This chapter focuses on how settlement is perceived by various groups of people, as well as how these perceptions contribute to the structure, that is, the issue of sense of settlement and form. The way in which the above characteristics are related to identity and structure will be given attention. The aspects that will be dealt with in this section are essential given that they allow the process of recognising and patterning of space. Some of the important components briefly highlighted are congruence, transparency and legibility. The accessibility of the settlement will also be thoroughly examined with particular interest as to how various people with different needs are able to reach different areas effectively and efficiently.

5.2 Sensibility as an essential aspect of the built environment

According to Lynch (1960), sense is the extent to which the area can be outstandingly recognised without any difficulty in distinguishing it. This means that the quality of area must be distinguishable when compared to others through its varying characteristics and spatial qualities. In a way, the inhabitants should be able to perceive and structure it so that they can mentally relate and connect with the environment through their senses (Lynch, 1960).

In the same vein, Drumbeller (1968) asserts that the authenticity of architectural experience is grounded in the language of building and the comprehensibility of the act of construction to the senses. People touch, listen and measure the world with their entire bodily existence and the experiential world becomes organised and articulated around the centre of the body. People are in constant dialogue and interaction with the

environment, to the degree that it is impossible to detach the image of the self from its spatial and situational existence (Drumbeller, 1968).

Kent and Bloomer (1970), in surveying the role of the body and of the senses in architectural experience, argue that what is missing from dwellings today are the potential transactions between body imagination and environment. According to them, every place can be remembered, partly because it is unique, but partly because it has affected our bodies and generated enough association to retain it in our personal worlds.

In essence, the residents of any particular settlement must be in a position to, at any point in time, relate with the physical environment and ensure that they are able to communicate effectively with it. In fact, the environment must be able to elaborate language that could extend the capabilities for spatial communication. This should be understood to mean that all signage that is part of the physical environment should serve as language that the physical environment uses in communicating with its users. This language need not be deeper than what visually impaired people could understand as this would mean that they will not be able to use it (Marston, 1996).

According to Tomas (1999) the model of information processing is based on three functionally distinct, yet interdependent, levels of mental operation, each resulting in different structures of knowledge, which together form the larger structure of a person's cognitive stock. The first level of mental operation is perception, which results in morphology – typological structures. The second is qualitative cognitive information processing, which results in referential structures of knowledge (i.e. general concepts of value and significance). The third is quantitative cognitive information processing, which results in particular structures of knowledge i.e. individual object and value concepts. The difference between a qualitative and a quantitative aspect of cognitive information processing is necessary. These approaches represent different qualities, because the individual instance of incorporating specific information into cognitive schemes must be distinct from the development of a general capability to make abstractions and form the referential frameworks that structure individual instances of knowledge.

In general, it is important for all residents and other people to have the ability to access cues with vision, but if they do not have good eyesight they should be able to use other alternative accessible cues so that they can be able to understand where they are positioned in a space. It is therefore important to ensure that visually impaired people are in one way or another capable of identifying all the helpful landmarks or signs that allow a person to move from their perceived position to the real world position. In actual fact, the lack of spatial knowledge acquisition ability that would ensure that a visually impaired person freely navigates the physical environment independently remains, and continues to be the most challenging barrier. This is supported by Bachelard (1989) who argues that modern architecture is biased towards the visual nature of designs, and adds that architecture of the exterior seems to have interested architects of the avant-garde at the expense of architecture of the interior.

One can distinguish three essential components of sense. Firstly, congruence, which brings up a very important factor that characterises a settlement through ensuring that such a settlement corresponds or could be linked with other places without any difficulty. The second one is transparency, which is essential for sensibility. Sensibility is crucial in that a settlement which is good enough has to be clear and not complicated, so that users may navigate with ease. The final one is legibility which is a quality that each and every place must have as it is concerned with the simplicity of understanding the physical environment. It particularly establishes the fact that a physical environment does not have to be hard to learn (Drever, 1955). Of importance here is to ensure that a settlement is created whose constructed meaning continuously unfolds in an unsophisticated manner. This means that there should be a straightforward formation of the first order structure that will facilitate an ordering which is far-reaching when fully experienced. A good form of settlement has to mean something to the visually impaired user especially when streets, houses or landmarks unfold. A visually impaired user must be able to identify all the elements of the settlement as they should be connected to one another, and be viewed as a whole and not parts, in an orderly fashion (Moore, 232-239). This should also encourage the formulation or creation of new meanings which would make the visually impaired occupier feel a sense of ownership over the space (Bryant, 1982).

Frank Lloyd (1984) is of the viewpoint that people possess capacity for recalling and imagining spaces. This is made possible by the fact that qualities like perception, memory as well as imagination are constantly interacting with the realm of presence which then gets combined into images of memory. That is, people always construct a huge city of its quality or character that tends to stay in their minds as long as possible. This viewpoint reflects the experiences of visually impaired people as they perceive the city structure and this is stored in their minds for use when navigating as they cannot see.

The senses are an essential and useful mechanism for enabling one to identify different things, to find one's way and to read the signs. Sense should therefore be understood to encompass a basic element of the emotional fulfilment of living in specific places. This is because it is an important tool that supports group identity and cohesion (Worchel, 1951). It also has a good connection with the mental development of the person. This takes place through the process of creating order which is the essence of cognitive development. Sensibility is also necessary when taking into consideration the maintenance of the continuity of adult personal identity (Bryant, 1982).

5.3 Access as an environmental characteristic

Access is one of the discourses that many writers have engaged in various planning literatures. However, in this paper the writer would want to approach it as being one's ability to get to areas where different important activity takes place, or to be able to gain information or other necessities (Lynch, 1960). Hence, one of the major and essential characteristics of a viable city is access which is navigable by the users. In essence, a city with reasonable access would ensure that private or individual mobility is made central to any establishment or development that takes place. In addition, the needs of various people with various experiences and abilities should be of greater importance in informing the design of an accessible city. Thus, people with their different needs be they wheelchair-bound, or cane users, should be guaranteed freedom of movement (which in this case means moving along without disturbances) by reducing or eliminating some of the things that creates problems and barriers in

most places (Juurma, 1973). The key obstacles that create barriers to access, by design or otherwise, are more likely to present challenges in reaching jobs, stores, schools, or hospitals. Even though these kinds of barriers affect everyone, they are more hazardous and continue to have a negative impact on the visually impaired people.

The inaccessibility of a city, whether due to the transport system and/or poor town planning, is one of the barriers that impinges on the range of goods and services that are important to visually impaired people's lives and development. (Hill, Rieser & Halpin, 1993). A good example could be of the change in urban form that took place in the last half of the 20th century which brought about the decentralisation of cities, and the movement of people away from the urban centre. Problems emanated from this particularly with regard to the urban poor, minorities, and the disabled people at a clear disadvantage since they had to make long and tiring trips that included a number of mode changes (Cleaves, & Royal, 1979). In addition to these unpleasant journeys, simply accessing information about transportation has proved difficult. In fact, this is one of the most difficult things to do as a visually impaired person, especially if one has to do it in places that are unfamiliar to him/her. The unpleasant process involved in this would practically include getting to where the required relevant information is located, the manner in which the information is accessed, and the incorporation of such information into a usual travel plan (Marston, 1996).

It is therefore of primary importance to know and understand that the issue of access continues to play an important role in influencing the decisions concerning residential choice by visually impaired people. However, this does not apply to only visually impaired people as it is everybody's wish to stay in an area that is maximally conducive, which is the reason why people prefer to be in areas that have the potential to offer adequate access to various necessities (Rieser, Hill, Taylor, Bradfield & Rosen, 1992). In addition to this, if the communities that reside in such a place are made up of people who do not own cars, then time use becomes a major deciding factor. This is largely because they would have to spend more of their valuable time travelling to various places, and if those places are not reasonably accessible it could be to their disadvantage. However, the time factor could be coupled with the danger and risk of being in such a place that may be unreachable by visually impaired people due to that particular environmental design. The issue of danger is more important as

well, particularly to visually impaired people, due to the nature of their disability, as it affects the frequency of travelling times and other related factors like feelings of uneasiness or a sense of exclusion (Barnes & Mercer, 1997).

Access has to be understood to be a crucial quality or character which has an influence on the visually impaired people's live. In essence, the routes, paths and directions which are likely to be used by various communities in their everyday lives are actually the ones that largely determine the quality of the settlement (Golledge, Klatzky & Loomis, 1996). The disappointing fact about access is that it continues to be denied to a particular group of people mainly when the difficulties, obstacles and barriers are not eliminated. In fact, visually impaired people are largely the victims of these barriers mainly because they use what could be referred to as mind-mapping for navigating the built environment.

As a result of inaccessible information and other types of barriers visually impaired people often experience obstructions that are largely responsible for the inability to move independently. Designs that are not well-thought out make most, if not all, areas exclusive and continue to serve as danger zones for visually impaired people. The most important thing to note here is that information is the prerequisite and the key to increased access (Golledge & Marston, 1999). The availability of limited access actually means that visually impaired people have to be assisted to enable them to find appropriate locations where transport can be boarded or locations where information about routes or frequency of travel can be obtained (Golledge, Marston & Costanzo, 1997). Conversely, people who are not sight-impaired are able to access signs visually provided that the information is of good quality, effectively placed, and contains accurate and brief information (Marston, 1998).

The fact that visually impaired people do not enjoy the same opportunities with regard to access as sighted people due to the difficulties that they experience when navigating an inaccessible physical environment may have dire consequences. As indicated above, lack of information required to successfully navigate the built environment poses a limitation in independent travel and access to urban opportunities. In addition to this are the anxieties, difficulties and stress experienced, along with slower walking plus search times that visually impaired people spent in

trying to locate themselves (Marston *et al*, 1997). All these challenges result in fewer trips that are made by visually impaired people as compared to their sighted counterparts (Golledge, Kwan & Gärling, 1994).

According to Frank Lloyd-Wright, architecture is engaged with fundamental existential questions in its way of representing and structuring action and power, societal and cultural orders, interaction and separation, identity and memory. All experience implies the acts of recollecting, remembering and comparing. An embodied memory has an essential role as the basis of remembering a space or a place. People memorise all the cities and towns that they have visited as well as all the places that they have recognised, into the long-term memory of their body. In memorable experiences of architecture, space, matter and time fuse into one single dimension, into the basic substance of being, that penetrates consciousness. People identify themselves with the space, the place, and the moment, as well as the dimensions that become ingredients of their very existence. It would therefore be reasonable if issues relating to disability and the built environment were to be amicably resolved, but that would only be possible if people could understand architecture as the art of reconciliation between people and the world. Of importance to note in this context is the fact that such mediation takes place through the senses and there should therefore be no excuse for not designing an environment that caters for the needs of visually impaired persons.

While acknowledging the fact that access is still a major problem in many areas, for various reasons, most of the devices required for this particular purpose and to provide relevant information are now available, and it is up to the planners to take advantage of them and use them in improving access for visually impaired people. This would include, amongst others, the provision of advanced channels, technology and spaces designed with visually impaired people in mind. However, this would require carefully planned and innovative redesign (Haber, Haber, Penningroth, Novak & Radgowski, 1993). Furthermore, it would also be important to eliminate all forms of social exclusion, including attitudinal, in addressing physical barriers. In the process outlined above, more effort should be made to improve legibility that should also be aligned with the training of the visually impaired traveller (Hill *et al*, 1993).

5.4 Conclusion

Chapter 5 dealt with two crucial qualities that should be seen in an inclusive city. The first one is sense, which shows how people perceive their settlements as well as giving them a structure. It is therefore clear that for people to be able to use these four elements that makes up the city, they must possess the appropriate capacity for communicating with the built environment that surrounds them. A variety of obstacles that makes visually impaired people unable to realise their potential in communicating with the built environment were outlined in this section and recommendations made. The second quality which is also fundamental to cities is access. Access has been discussed in this report as the ability to reach different elements that are needed or desired, and the quantity and diversity of these. Thus, attempts were made to highlight some of the main barriers that cause inaccessibility in urban spaces. What has been emphasized throughout is that even though most of the barriers affect poor people, the aged and the disabled, the disabled are the worst victims due to lack of access to information and other key factors. This chapter is a crucial part of the thesis as it provides the focus of the thesis and the questions which must addressed in order to ensure improved design of an inclusive built environment that is capable of taking advantage of senses other than sight. Practitioners in the field of urban design will be better-informed on how to design an inclusive space that not only depends on the use of sight.

CHAPTER SIX

6. INTERVIEW ANALYSIS

6.1 Introduction

In this chapter the difficulties experienced by visually impaired people due to 'transformed spaces' will be illustrated through a detailed analysis of interview transcripts with twelve visually impaired people living in or around Pretoria. The elements of the built environment discussed in chapters four and five as well as their impact on the daily experiences of the interviewees particularly when moving around are vividly demonstrated. These elements are landmarks, edges, nodes and path which is critical in the analysis included herein as these are supposed to divide the environment into smaller, clearly connected and more manageable sections that could be directly encoded into a hierarchy of spatial knowledge.

The data used in this chapter were collected using a structured open-ended interview process. Analysis revealed that visually impaired people become spatially confused, for example, lost or disorientated for two primary reasons - 'self-produced', a spatial confusion caused by the misperception and/or misrecognition of a route - for example, miscounting intersections (Loughborough, 1979). The second factor could be referred to as 'situational confusion' caused by a permanent or temporary localised occurrence such as roadworks, vehicles parked on pavements, and street furniture (Gray & Todd, 1965: 33-64). The writer found that both types of spatial confusion cause feelings of fear and anxiety that leads to a loss of self-confidence, embarrassment and frustration, which in turn leads to less independent travel and exploration, and constrained patterns of spatial behaviour (Marston & Golledge, 1997). It will become apparent in the course of the analysis that the interviewees apply a number of strategies that they often use for coping with the abovementioned spatial confusion. In addition, they suggested methods that could make the city more navigable, including environmental modifications and orientation and mobility aids.

The kind of analysis offered in this chapter should be taken as part of a limited discourse that is already in the public domain though with a slightly different approach. There has only recently been an increased focus on issues of disability. Before 1990 there were only few research studies conducted which solely focused on disability (Hall, 1995: 1-26.), although there has been some increase in the research output, as seen in the range of issues addressed (Park, Radford & Vickers, 1988: 208-233). This research aims to add to the understanding of disability with particular focus on visually impaired people, through an assessment of the daily experiences of people with visual impairments in negotiating the built environments of Pretoria and its surrounding towns.

The legislation and policy issues dealt with in chapter five have been shown to be crucial in guiding and prescribing how planning should be conducted particularly with the aim of accommodating visually impaired people. It is this legislation that determines the state of the built environment, as well as its modification thereof. Therefore, the analysis provided in this chapter could easily be aligned with the loopholes alluded to in chapter six, drawing on the information from the interviewees.

The manner in which society responds to issues that involve disability as explained in chapter four are also highlighted in this analysis. The way in which the behavioural patern of the society is manifested as demonstrated by the two models of disability, the Social as well as the medical model, is clarified. Thus, the attitudinal, organisational and the environmental barriers manifested in our outdated pieces of legislation become apparent in the planning of the built environment, how it is understood, as well as its adverse impact on visually impaired people.

6.2 Background

It is important to note that, amongst all the sensory and physical impairments, visual impairment is supposed to be the one that receives the most attention from planners. This is because vision is often cited as a spatial sense (Foulke, 1983: 125-141). That is, vision allows spatial information to be easily collected and processed thereby

providing immediate perception of objects within an environment and allowing oneself to maintain orientation, to differentiate perspective and scale, as well as locating objects in relation to one another and the perceiver (Lawton, 1994: 765-779).

Previous research studies have shown that there is a generic perspective that embraces the fact that because p eople with visual impairments have to rely on other senses, such as tactile and auditory and modes of learning that are sequential in nature, their spatial knowledge is limited and their spatial behavior restricted. As a result of this belief, writers like Golledge (1991, 296-301) have argued in a conclusive manner that the inability to travel independently and to interact with the world is one of the most significant problems for people with visual impairment. He further says that people with visual impairments occupy perceptually transformed spaces. This means that the meaning of spaces, form and function changes to more complex spaces that are strenuous to navigate and potentially hazardous. Basically, for visually impaired persons the obstacles and barriers are multiplied and expanded well beyond the normal range as sidewalks and streets may be thought of as treacherous paths, while stairs may be perceived as impossible cliffs, distinctive sizes, and shapes or colours may lose their significance. Thus, space is more likely to be distorted through incomplete knowledge (Golledge, 1991: 296-301).

Having demonstrated how the built environment is perceived by visually impaired people, a detailed set of suggestions will be presented, as proposed by interviewees. These suggestions would hopefully contribute to making Pretoria less threatening and more navigable by visually impaired people. The data analysed were collected through semi-structured interviews addressing issues regarding how people with visual impairments remember and learn various routes when navigating the urban environment (Keppel, 1994).

The participants consisted of seven people who were totally blind (no vision) and five people who were partially sighted. All respondents either stayed in Pretoria Urban Area or within a few kilometres from the inner city. Various methods were applied in recruiting them as the writer had very little knowledge about the community in question. The totally blind respondents consisted of two females and three males, aged between 20 and 35 who had been blind between two and 35 years. Three of the

totally blind interviewees were cane users and two were guide dog users. The partially sighted interviewees consisted of three females and two males, aged between 23 and 30 who had been partially sighted since birth and used their remaining vision to navigate. The orientation and mobility training of the blind and partially sighted interviewees varied considerably. However, the majority of participants had received orientation and mobility training after becoming visually impaired, which also include rehabilitation, guide dog or cane training and the learning of routes to places of relevance in their daily lives. Only two partially sighted individuals in this particular study had received no orientation and mobility training. All the data were collected between June 2005 and June 2006. Interviewees were not paid for participating.

All interviewees were interviewed collectively in various locations and at different times but similar questionnaires were used. What is more interesting is that interviewees responses were not restricted or constrained to certain categories as provided by the interviewer but consisted of whatever answer they wished to give, in line with the approach by Haber *et al* (1993). By using such a strategy it is expected that the open-ended questions will provide responses that better reflect a person's own thinking, in contrast to a more informal conversational strategy where there is no set agenda or questions (Horowitz, 1974). This strategy was very important in increasing the comparability of responses and ensured responses to all questions for every interviewee. This strategy was also useful in reducing interviewer bias. Furthermore, this approach provides a base on which to organize for analysis of data (Crane, 1996).

This process of analysis made it easier to explore the richness of responses in a constructive and accurate manner, allowing the data to 'speak for itself', so as to show the sorts of problems and related emotions encountered by visually impaired people as they navigate through an environment, and what they see as potential solutions. All interviewees and some place names have been changed or omitted to preserve anonymity. Although there is a need for a more in-depth research to be conducted, this report provides some early insight into the spatial worlds of visually impaired people and highlights the issues that further research could be based on.

6.3 Analysis

With regard to spatial confusion, it was clear even before analysing the transcripts that people with visual impairments live within transformed spaces, as all had detailed problems encountered when navigating through an urban environment that would not have affected their travel had they been sighted. However, this should not be taken to mean that interviewees did not successfully, and in the main independently, travel around Pretoria during the course of their daily lives. Each one related how the urban space is in their experience transformed and the difficulties encountered when navigating alone an urban space without sight.

Upon detailed analysis of the interview transcripts it became clear that the problems experienced and the spatial confusion caused could be divided into two different types: self-produced confusion and spatial confusion. The first is caused by the actions or misperception of the visually impaired person as they navigate a route. Clear examples would be of someone attempting shortcuts and making a mistake in counting points. In this case, the visually impaired person is directly responsible for their spatial confusion. It should be noted that 'self-produced' confusion is not limited to visually impaired people; many people become lost or disorientated when they travel, but that it may be most often experienced by visually impaired people, given the importance of sight in the navigation process. In many cases, a person with a visual impairment may be faced by situational confusion, a spatial confusion caused by a localised occurrence that may be permanent or temporary in nature. Here, confusion concerning location, orientation, and the route to be taken is caused by specific features and occurrences or incidence in the built environment, for example, roadworks, vehicles parked on the pavement and street furniture, which all disrupt the paths taken by visually impaired people and require spatial actions to avoid obstacles.

6.4 Self-induced confusion

It was made clear from the transcripts that self-produced confusion happened due to two main reasons. In the first case, confusion occurred because the visually impaired

person used spatial knowledge inaccurately, for example, miscounting the number of intersections (Couclelis, Golledge, Gale & Tobler, 1995). For example:

Int 1. I got lost once. I crossed too many streets and I ended up going in the opposite direction, and it happened when I was attempting a short cut through an area that I thought I knew well.

Int 2. I tried that [shortcutting] once, I had to go to a shopping centre and I cut through and I got completely lost. I was thinking where Central City would be, and I walked down this street, but I ended up meters away.

In the second case, confusion seems to occur because of incomplete knowledge. For example, the spatial layout of an area known well might have been changed whereas the spatial knowledge of the individual has not been updated (http://www.bumc.bu.edu/Dept/images_new/go-nav2.gif, December 2005).

Int 1. I hadn't been down in the town for a while, but I knew there was work done on this part of the road. I did not realise about the new constructed road. Nobody had ever told me about it. I was walking across towards Schoeman Street, and I suddenly heard the roaring of a heavy truck. I said to myself this one is going to get me. Then it went underneath and I was OK.

In one case, an interviewee reported that she, time and again, produced the same self-produced confusion by miscounting the number of intersections.

Int 7. When we first moved here, my son used to go to primary school at Thabang with my friend's child. I took him to school every day for a number of weeks and I managed to get to school without failing. But when I came back on my own I always took the wrong turning. I thought it was the one before I should have done; I always ended up at the same place.

6.5 Situational confusion

The following evidence will be based on situational confusion. The transcripts revealed that situational confusion arose due to a number of different reasons, the most important being pavement clutter that blocked paths, created obstacles, and in some cases could be considered health hazards (Bronzaft, Dobrow & O'Hanlon, 1976). This disorder and untidiness ranged from permanent street furniture such as bollards and benches, to semi-permanent shop-related items such as outdoor stands and signs, to transient features such as skips, bins and vehicles parked on the pavement (Bronzaft *et al*, 1976) as the following statements demonstrate.

Int 2. A lot of shops now have huge amounts of pavement clutter, if it is sunny and brighter and there are lots of people then I will bump into things.

Int 1. The cane is good, but there are things that it cannot detect like head high signs and skips which can do a lot of damage.

Int 5. Here the streets are very narrow as well as the footpaths. But they also have steps onto the pavement, hanging out, and it actually cuts the footpath in half again. There are also an awful lot of obstacles. When they put trees in and take a tile out of the pavement it becomes a problem for me. There are flower boxes hanging on walls too, at head height, at body height.

Int 8. Prams and bicycles are very problematic; cars parked on pavements are a pain and irritation.

Int 4. The cane does not detect overhangs. Last November a truck was parked near the road. I went underneath and I got hurt. I broke my nose and as a result I had 2 black eyes.

Int 8. Thursday and Friday morning is very bad, because these are bin days. All the bins are collected and all over the place, the pavement, the street, half in driveways. With the cane, this was a very big problem, but now because I have a dog, he just leads me straight through. Other shop-related problems concern the design of the shop entrance and the spatial behaviour. Some environments tempt in other shoppers.

Int 3. Some places in the shopping centres you have to go up and feel around the shop front looking for the door. You don't know if it is a window or a door.

Int 9. I try and avoid some shops everybody in it is all over the place as opposed to ordinary shopping streets where people tend to walk in parallel lines along the pavement.

Another important reason for situational confusion that the interviewees pointed out was road works which created the need to find an alternative path and often masked the locational sound clues used by some interviewees to find their way.

Int 4. I was on the other road, lines of shops; traffic and they were digging holes. There were a number of diggings going on, it was very disorientating. I could not use the sound of the traffic to work out which way I was facing.

Int 2. I sometimes got off the bus at the right stop to find that the road had been dug up. The noise of the men working let me know that they are busy working, but it is disturbing, as you cannot find other sound clues to get around that.

Int 5. Cables were put everywhere. I fell down many holes, you know. It did not seem to be planned; there were different bits of work all over the streets. They do not take people with sight problems into consideration. Crossing the road can be a particular problem because there is no sign where people must cross. That is, where crossing exists it is not designed to assist people with visual impairments to cross.

Int 10. The main problem is that there is no facility to show where one should cross and there is no sound from traffic lights for traffic management or whatever. I find it frustrating. Half of me thinks the motorist is waving me across, but then I can't see him, so maybe he gets frustrated too.

Int 1. Other hazards include crossings without knowing, and I can't see whether the lights have changed or not.

The problems of the siting and number of crossings were also illustrated by the interviewees. Some respondents said that they even had to take long routes to get between places that were geographically near in order to use a crossing. For example, one interviewee said that when he wanted to get from one side of the road to the other he had to walk a quarter of a kilometer up one side of a street to a crossing and then walk back down the other side again. In some cases, specific spatial layouts caused confusion, making the visually impaired person unable to locate or orientate himself/herself within the layout.

Int 2. I went to Soshanguve for the day. It was built on a square, but I never knew what section of the square I was at. I could have been three quarters of the way around when I needed to only go back a quarter, but I had to go around. There was a river and a bridge and everyone seemed to go by these, but they didn't mean anything to me. It was frustrating and I was much disorientated.

The use of public transport, which the majority or almost all visually impaired people rely upon, can also create other problems. In some cases these problems are caused by an inability to identify the destination of the transport (Strelow, : 13-27).

Int 3. For a number of times I have been not lost, but misled. Recently, when I was on a course I got the wrong bus one morning. There were two buses leaving, one was an express to the back of the city hall in Pretoria and the other one went to somewhere. I later knew that the bus I was on was not going to the right place and I started worrying and in other cases it is keeping track of where the transport is along its route.

Int 7. If I am on a train or a bus and I am going where I have not been before, I can be very anxious because it is travelling so quickly that until we get to the stops I can't know where I am. I have to concentrate very hard. One particular problem experienced in Pretoria is caused by the pavement which is flat with the road, and in the absence of a tactile pavement it provides visually impaired people with no feedback about where the pavements end and the road starts.

6.6 Self-reliance and confidence

Negative feelings raised by spatial confusion as part of the problem were also highlighted, such as feelings of fear, confusion, panic, anxiety and worry. Other studies have indicated that many blind people only use the familiar routes that they know as exploring is stressful, disorientating and creates anxiety (Pellegrino, 1990). This fear and anxiety manifests itself in constrained patterns of spatial behaviour (Blasch and Stuckey, 1995). Also related to fear and anxiety are feelings of self-confidence, embarrassment and frustration. Almost half of the interviewees indicated that they suffered from low levels of confidence that prevent them from travelling alone, and were very concerned about their actions and the opinions of other travellers, which undermined their spatial behaviour.

Int 4. The most frustrating thing is that I don't have the confidence to go to an area that I am not familiar with. That is my own feeling. I am limited to the places I know.

Int 3. When I do go into shops everything gets stuck for a moment. So I stand there and look like a picture, everybody looking at me.

Int 1. In reality there is a feeling of worrying to be honest. In that situation being lost I always retrace my steps. If this does not work I ask people if I was looking for somewhere specific. I think I get too embarrassed to tell people that I was lost, but if it came to it I say it.

Some interviewees said that they had been verbally criticized and abused for accidents such as bumping into street furniture and asking for help when negotiating a route. As a result, some of the interviewees said that they stopped using their cane to assist them navigating for fear of identifying themselves. One interviewee explained that the white cane can be a problem sometimes because when it is used it leads to unwanted help and when it is not used people do not care.

Int 5. Maybe that is hard to explain. When using a white cane everybody is always grabbing you by the arm and leading you across the road, whether you want to cross

or not. When you ask for the way and you don't have a white cane, people tend to treat you as if you are stupid. What is the matter, it's just over there, and can't you see it?

As a result, one interviewee relied on another cue, using an umbrella as a cane.

Int 5. I don't carry the stick because I am self-conscious.

Int 2. I don't like being lost. I hate being out of control. It is not a good feeling. It is a bad feeling. It also makes one lose confidence. All of a sudden you are not where you think you are and you feel as if you are a stupid. You feel inadequate in some way when you think that any person can do what you cannot do. How I solve it is to ask somebody. It has taken me many years to reach the point where I can ask somebody. You get different answers that are not good, like "are you blind?"

6.7 Coping strategies

In dealing with the transformed geographies of self-produced and situational confusion, and to try and minimise feelings of panic and anxiety and to maximise their confidence, all the interviewees said that they uses a number of coping strategies. For instance, they said that they tend to restrict travelling alone to well-known, familiar routes and to travel with a friend when negotiating other routes. However, when the first strategy failed, or a form of temporary situational confusion was introduced (for example, road works) or if a friend was not available and the route was still attempted, then other strategies were tried (Blasch & Stuckey, 1995). The most common of the secondary strategies was to ask people.

Int 1. I would ask a passerby to tell me where I am, then I can get my way and try to rectify it from there. I usually try to get back on route as quickly as possible so it is always easier to ask.

However, most interviewees were reluctant to ask for help, initially preferring to try and find a solution to their dilemma, only resorting to asking when their other

strategies failed. For example, some interviewees would decide to go back to take an alternative route or, if confident, seek to find an alternative path around the obstacle.

Int 1. As I came across it, say the road being dug up, I would ask them how far it extended. Then I would try to work out what the shortcuts would be. As long as you know where you are going you are OK. If I was to go down A, B and C it will put me back on the route, and then I am happy enough. First left, first right, next right or whatever.

Int 2. It depends on what way I want to take. I usually think about where I need to go, to go parallel on another street.

The reluctance to ask for help was, in the main, an attempt to retain independence, maintain pride and confidence, and minimise embarrassment.

Int 5. Last year on holiday I was lost and I was very angry. I asked for help from one of the pedestrians. I could not find my way back to where I was. That was the last time I was lost. It made me angry and frustrated. I did not mind asking for help, but it made me feel bad.

The next most popular strategy, particularly in the case of self-produced confusion, was to retrace along a route until a familiar place was located.

Int 10. What I do is to go back to where I started and then start again. I have to retrace to go back to where I know.

Interviewees also employed a number of less-used strategies. For example, three of the partially sighted respondents described using their limited vision to follow other pedestrians.

Int 2. If I am in town I always try to follow the flow of people, using them as guides even though they do not know it. I also do that when I have to cross the road. Rather than asking each time, I always find somebody and then follow him or her.

In the case of situational confusion the guide dog users would use orientation skills as a way out and mobility training to re-orientate themselves before doing anything.

Int 4. There were a number of diggings going on, it was confusing and I was unable to use the traffic sound to work out which way I was facing. So I turned, took the dog to the kerb to reorientate myself, turned back and walked through the parallel streets that I know.

In a few cases, interviewees stated that they relied on the guidance of family and friends when travelling; only independently exploring few well-known routes.

Int 3. It is a lot easier, picking out the gaps in the wall, or going into shops. Generally my partner helps me. If I was alone I don't know what was going to happen.

In general, however, it should be stressed that there was a high degree of independence amongst the interviewees, most of whom were happy to travel on their own, as long as the route was well known. The need for familiarity meant that the number of routes each interviewee travelled was small, as only few interviewees showed the willingness to attempt shortcuts, take alternative routes, or attempt routes for the first time without help. As a result, a pattern of unaccompanied spatial behaviour was restricted to a few routes. In addition, due to the difficulties of learning a new route most interviewees rarely learnt a new route and this was done only when they were going to be used regularly.

Int 9. I take time before deciding to learn a new route. I know everywhere I go. The only time I go anywhere unfamiliar is when we are on holiday, once a year.

Int 2. I don't learn new routes, unless if there is a special purpose like going to the hospital. I don't go to strange places unless if there is a need.

6.8 Envisaged environmental modifications

In addition to asking interviewees about their everyday experiences of navigating through the urban environment, they were asked about their views on what improvements are needed in relation to the planning and use of urban spaces, and discussed the potential benefits of possible navigation aids.

From analysis, it was clear that the environmental improvements that interviewees suggested were more aimed at r educing situational confusion than self-produced confusion. In other words, interviewees wanted to see changes to the urban fabric through which they navigated that would make their journeys less burdened with difficulties and potential hazards. In the main this consists of simple, low cost alterations, such as minimising the amount of street furniture.

Int 2. A very simple thing to do is putting larger signs and painting the edges of all steps.

Int 10. Larger signs are needed. Street signs in most towns are too high or too low to read.

Int 6. They should paint the kerbs, that would help. Sometimes I fall off even with the cane. I have been knocked down twice. Drivers don't realise even if you have a cane. They don't care. It scared me a bit last time; I just lost the edge of the kerb.

Int 9. Painting a shop doorway would be good, like a yellow line by the door. I am always walking into shop fronts looking for the door.

Int 6. With regard to steps and things like that, I think a white or a yellow line on the step corner will be good, to indicate the end of each step. Maybe, a couple of bands on a bus stop say white for a lamp post and red or blue for a bus stop.

Int 5. A white line on the edge of steps can be best for me. Buses can be good with their indicators - the signs. They are not reliable. You can't depend that the bus number actually will match the bus. The numbers are not big enough. You don't have a hope - that is a very big problem.

Int 9. Move lamp posts to one side of the pavement.

Int 4. People need to cut overhead branches, so you don't walk into those. Street furniture, I mean outside shops or to display things, this needs to be tidied up.

Furthermore, interviewees indicated that there needs to be consistency in all the structural modifications and additions to the urban fabric that are undertaken. For example,

Int 4. Tactile pavements need to be constructed and standardised and there needs to be more of them.

Int 3. We need consistency, they are not uniform. You can spot a white line on one set of steps and then take a tumble on the next. Positioning of signs needs to be better.

Int 14. After the building of the tactile, they must be made to be the same wherever they are placed with size, shape and position. Thus, we need consistency, and such tactile markings must be at crossings and road junctions. They could be good in every area but they must always end up at the traffic light pole with the button. If there is consistency it will really improve my confidence.

Int 2. Painting the edges of kerbs is a good idea, and the tactile stuff. In some streets the lamp posts are at the edge of the kerb, on others they are on the inside - there is no logic. More standardisation or order can be good.

It was also felt that improved navigational assistive devices would help very much in lessening self-produced confusion and open up possibilities of independent travel. A number of different assistive devices were discussed. Interviewees generally thought that tactile maps were a good idea, albeit with some degree of doubt (Kitchin, Blades & Golledge, 1997).

Int 4. A tactile map can be very useful, and they will be fun too. There are parts around here I don't know very well, a map of Braille will be very great.

Int 2. I imagine for me to pick out the map, the map will have to be very big because I do not read Braille, so my fingers will not be as sensitive as someone who reads Braille.

Int 8. I will be more interested in practical experience in the environment than to use my memory of a map.

Int 6. I had seen them before but I did not find them very useful. I found that using it for me was difficult, I did not understand it.

Similarly, it was felt that both talking signs and audio guides would be useful assistive devices to navigation.

Int 4. I have used an audio guide before in Johannesburg. They were fine, especially from the point of view that the information is good. In terms of getting around, it was confusing because there were many people in a small area. I can say that anybody sighted can find these very useful too.

The tapes are good although some interviewees were concerned that they might interfere with using aural locational cues.

Int 2. I think they will disturb me. I like to be able to hear everything that is going on around me.

The greatest interest was expressed more on personal guidance systems which combine global positioning system technology with a geographic information system (GIS) to provide a system which keeps its eye on the ground location and further provides verbal route directions between places around it. Many interviewees felt this might open up possibilities of independent travel (Bentzen & Mitchell, 1995).

Int 5. This will be very useful in places that I am not familiar with. It will encourage people to explore. A good move towards independence.

Int 1. This will be the best and I can explore. It will open the world. I will not be limited by my routes or by my limitations any more. It would be unbelievable.

However, not all interviewees were interested.

Int 8: I will always prefer my dog because it provides the personal touch and it breaks down barriers.

Current O and M training (orientation and mobility training) was generally praised, but there were suggestions that instructors needed to appreciate that different people require different things, that the time lag between losing sight and O and M training needs to be reduced, and new technologies need to be incorporated.

Int 8. Even though I can negotiate things, I tend to do it my way. O and M instructors need to recognise this, rather than just sticking to the textbook way. For instance, in using the cane, I know how to correct my step if I get out of step with the cane. Also, I always keep more to the inside of the pavement, towards the wall. When using a sighted guide I rather hold their hand than their elbow. People are not aware that there are so many different ways of doing it. Whatever works for you and you are comfortable with is the best to use.

Int 4. The O M instructors tell us what to use as guidance when walking but they do not let us practically experience it.

Int 5. I prefer a blind O M instructor because he will be teaching me what he knows. A sighted instructor is very much protective and you end up not learning anything.

Int 9. I have experienced for myself things like the signs that I have to use. O M was not so usefully for me.

Int 3. I use my own method for exploring because O M is not good for me. I know that if I pass the tree on my left I will be next to the corner of my house. I also know that next to my child's school there is an electricity generator that is always making noise.

Int 7. My workplace is near a very big dam so I always use the sound of water as a sign. There is also lot of concrete next to the gate so I always know when to turn and where the gate is.

Int 2. Even when using my dog I know that after a ramp is the bus stop, but the ramps are not everywhere, which is a problem.

Int 1. I do not depend much on my sight; I always rely on the bakery for me to know that I am next to the University gate.

It is crucial to consider how acquired spatial information is used to organise and regulate behaviour. There are two kinds of information that could be differentiated, perceptual information and cognitive information. Perceptual information is easily obtained directly from the space in which the navigation is performed, and used continuously (Skory, 1995). Travelers use this information differently according to their understanding. For instance, if they can collect sufficient perceptual information which is accurate and specific, having been acquired soon enough to allow for the organisation and timing of the behaviour it commands, it could control the mobility by guaranteeing orientation and safe movement in space without much help from memory. This is what happens if one is sighted as the perceptual information is simply acquired through visual observation.

A number of experiments, for example Barth & Foulke (1979), have showed that skillful performance depends on the ability to anticipate the necessary behaviour by simply understanding the features of a situation before the time of an actual act. The sighted person who is able to get notice on time, that makes him or her aware that a barrier is 10 or 15 meters away has enough time to prepare himself for a sequence of movements which will ensure that the curb is negotiated skilfully. However, because the space that can be perceived without sight is so small, the blind person has little time to prepare for perceived spatial features even if the curb that has to be discovered by the tip of the cane is only a step away (Pellegrino, 1990). Thus it is believed that the visually impaired person lacks the perceptual anticipation that supplies the sighted person. Nonetheless, the visually impaired person has the ability to replace the

missing perceptual anticipation. Just as perception information can be used for informing the current behavior, it can also be remembered. It must be borne in mind that even when perceptual information is not enough to indicate the necessary action for navigating successfully it can be added to the information that is already in memory and as new spatial experience is built, the memory representation of that space is also gradually formed (Pellegrino, 1990). The information supplied by memory is not necessarily limited or restricted to representations of perceptual information but it also consists of information established by inference. For example, the relationships of the spatial features that could be remembered, particularly those that were not experienced at the same time, means generalisations are made possible by the reappearance that demonstrates constructed spaces, and information received by way of spoken or written language (http://www.bumc.bu.edu/Dept/images_new/go-nav2.gif, December 2005).

For visually impaired people the memorial representation is created with pieces of information gained in many different circumstances. This type of memory is less accurate than that of sighted people, mainly because it is created with information collected in larger amounts on fewer incidences. For instance, because sighted people are able to view a large space at a time they can see its features as well as gaining the knowledge of how these features are related. On the other hand, visually impaired people must bring together spatial information that has been collected at different times and thereafter try to understand the spatial relationship of these many features by inference (Genensky, 1978). Even though there are many mistakes in the representations based on pieces of information, a corrective measure comes into existence as this information gets evaluated and corrected by the feedback resulting from the behaviour based on them. However, its likelihood of accuracy is not as high as the representation memory achieved by sighted people (Genensky, 1978), as the memory of representations of visually impaired people are also disadvantaged in respect to the quantity of information they contain.

Visually impaired people can only detect very little of the spaces bounded by the paths along which they walk. They also learn very little about the buildings or trees that are generally found in such spaces and things that are not seen and remembered cannot serve as landmarks. Thus, with regard to landmarks, spatial features may

become landmarks if they allow people to locate themselves in the space in which they are moving as well as understanding where they are. For spatial features to act as landmarks they have to be stable, and people must remember those spatial features and how they are related to one another. In addition, people must continuously keep their knowledge of the changing relationships between stable spatial features and themselves when they move (Coburn, Martin, Thompson & Norstrom, 1992). Landmarks can be anywhere within the reach of the perceptual system with which they are viewed. They may be located in the spaces that are surrounded by a path, or right on the path themselves. Landmarks could as well be, for example, the large house with the distinctive roofline, the old tree, the sharp curve at the sidewalk, and the bump in the sidewalk caused by the tree root underneath. These are all spatial features and can serve as landmarks for people who are able to identify them and to relate them to other spatial features (Lynch, 1960). Some of these spatial features, such as the bump in the sidewalk, can be landmarks for blind people, while spatial features like the house with the distinctive roofline can be landmarks for someone who can see. Detecting the spatial feature that serves as a landmark is a perceptual event but knowing that it is a landmark is achieved by consulting memory (Coburn *et al*, 1992).

The spatial features that are at distant spaces used by visually impaired people are objects that produce sounds. However, for the visually impaired person to use them, audible features must be closer to the viewer. Furthermore, if a sound is to serve as a landmark by supplying the information that allows the user to estimate the position of its source, and infer its cause, it must be produced by an immobile source, so that it is available when the user needs to consult it (Bentzen, Jackson & Peck, 1981). Generally, people do not need landmarks to maintain orientation in immediate space because a sighted person can always see the surroundings. However, when spatial features perceived in immediate space are remembered and their relation is known, visually impaired people can use landmarks in immediate space for orientation. When they move beyond the boundaries of immediate space, landmarks quickly become undetectable and must be replaced by other landmarks in the current immediate space. This is because the knowledge of distant spaces that visually impaired people have is not enough and is undependable, and they must depend on landmarks in immediate space (Brambring, 1982).

Thus, visually impaired people must learn and remember many more landmarks than sighted people. As there are no landmarks that visually impaired people can use at a distance (Pellegrino, 1990). The conceptions of the distant space achieved by blind people depend largely on remembering spatial features in immediate space as well as learning the relationships among them. Their immediate space consists of the space on and near the paths along which they walk. Because their memorial representations include very little information about the spaces when they add in their memory the features of immediate space, the conceptions of space at a distance resemble networks of spatial corridors (Hall, 1995).

When people are navigating spaces that are familiar, their memory supplies them with information about those spaces, but when they are in unfamiliar spaces their memory can provide information only about similar spaces that may be related. The fact that the built environments display replication means generalisation is possible. These generalisations allow visually impaired people to predict what they will come across in unfamiliar spaces. Though one cannot fully depend on this type of memory, visually impaired people usually navigate until enough experience has been gained (Foulke, 1983, 44-45).

6.9 Conclusion

This section has explored the geographies of people with visual impairments through an examination of qualitative data collected through semi-structured interviews. The transcripts have demonstrated that people with visual impairments do live within transformed spaces, and urban environments that are more difficult to negotiate, than for sighted individuals. The problems of unsighted navigation were shown to depend on both self-produced and situational confusion. In the first instance, spatial confusion was introduced due to a mis-processing of spatial knowledge or through having incomplete spatial knowledge. It was suggested that the best way to deal with self-produced confusion was through improved navigational assistive devices that would provide visually impaired people with overall spatial information concerning particular routes/areas. In the second instance, spatial confusion was introduced

through specific permanent and temporary features and occurrences in the environment including street furniture, road works, and vehicles parked on the pavement, which all disrupt the paths taken by visually impaired people and demand that spatial actions be adjusted. It was suggested that the best way to deal with situational confusion was through simple, low cost alterations, such as minimising the amount of street furniture, painting the edges of curbs and steps, introducing tactile pavements at key locations, and adjusting the position and size of signs. In addition, these adjustments need to be standardised across environments.

The interviews indicated that the introduction of improved navigation assistive devices and improved environments will reduce levels of spatial confusion, reduce fear and anxiety and increase confidence, and will hopefully lead to greater independent travel along more routes within an urban area. Given that the data in this research report has been derived from short, two-hour long interviews consisting of semi-structured questions, which were designed to provide contextual information for my research report, there is a need to extend the analysis to further examine the spatial lives of visually impaired people in a more systematic manner. Initial analysis highlights that the quality of urban living experienced by visually impaired people is far from its potential standard and a number of issues clearly need to be explored further.

CHAPTER SEVEN

1. RECOMMENDATIONS

7.1 Introduction

Visually impaired people rely to a great extent on their sense of hearing, touch and smell. This poses a challenge to designers of the built environment, as they must adjust so as to accommodate this type of group through incorporating certain aspects of sound, texture and aroma in an endeavour to assist these people in the exploration and usage of their surroundings. Visually impaired people vary as regards their sight level. The results revealed that as visually impaired people walk, they confirm their location by means of information ranging from unchangeable features, such as facilities along the route and the shape of the sidewalk, to the sounds and smells of shops they pass. The following recommendations concern people who are totally blind as well as those who have low vision. These recommendations are meant to ameliorate the difficulty encountered by visually impaired people when navigating the built environment. It is the author's view that the recommendations below could go a long way in assisting planners in ensuring that architecture and urban design takes into consideration the experiences of visually impaired people when designing the built environment. The recommendations are particularly directed towards the resolution of the three primary barriers discussed in this research report.

7.2 Attitudinal barriers

Attitudinal barriers as indicated in the chapter dealing with Models of Disability reflect both personal and societal feelings towards disability. The result of a negative attitude towards disability will be both the exclusion of disabled people from general activities and a misconception of what disabled people are capable of doing (Stienstre et al, 2002).

7.3 Organisational barriers

These kinds of barriers as shown in the report reflect the attitude of any organisation that the disabled person endeavours to use. An organisation need not be defined in a purely business sense, but can include any social or governmental organisation. The result of a negative organisational barrier can be demonstrated in the failure of the organisation to accommodate disabled people, or in the failure of the organisation to adapt itself to accommodate disabled people (Stienstre et al, 2002).

7.4 Environmental barriers

The research report has also intensively discussed and analysed how the lack of awareness of environmental barriers reflects both attitudinal and organisational barriers. The result of environmental barriers is an inaccessible environment. This may be caused by the failure of project developers, designers or constructors to conceive that disabled people will use their facilities, or a lack of knowledge of the issues that affect them Stienstre D., et al, (2002).

Other factors include:

- The inability of the construction and manufacturing industry to develop mainstream buildings and products that will allow disabled as well as non-disabled people to use them.
- A lack of central and municipal government technical guidance and enforcement of access standards to the built environment and product design research dynamics (Stienstre D., et al, 2002).

Of primary importance however, would be to address issues relating to attitudinal barriers, which occur when non-disabled people:

- ***Make assumptions about disabled people*** - by making decisions for people rather than finding out from the individual what he or she requires, for example, that a person with a white stick standing at the robot would want to cross the street.

- ***Act on stereotyped images*** - by telling a disabled person how 'brave' they are, or by refusing to engage a visually impaired person in issues thought to be more visual on the assumption that visually impaired people tend to pay more attention to audio.

- ***Failure to treat people equally*** - by being rude, impatient, discourteous, or even over-attentive. A non-disabled service provider may, for example, try to rush someone with a visual impairment without trying to understand what he or she is saying or wants.

- ***Make responses for reasons of vanity*** - by treating or seeing people who look different as being in some way defective or less than whole (Office on the Status of Disabled Persons (2003).

7.5 Solutions to attitudinal barriers

Attitudinal barriers can be overcome by fostering positive attitudes towards disability. An affirmative approach is needed which looks for ways that would encourage people within an organisation to take a positive attitude towards disabled people. It is particularly effective to have disabled people in positions of power, acting as positive role models. Fostering a positive attitude also requires that guidance be given to staff within an organisation on how to take a positive attitude towards disabled people and to engender positive interactions between non-disabled and disabled people (Geldenhuys, 2002).

Dealing with negative attitudes to and stereotyping of differences requires that action be taken to prevent situations arising or becoming problematic. This is addressed by overcoming organisational barriers (Geldenhuys, 2002).

7.6 Solutions to organisational barriers

The presence of organisational barriers provides the clearest example of indirect discrimination. For example, if it is the policy of a restaurant not to allow dogs, a blind person who requires a dog as a mobility aid may find him or herself excluded (Burger, 2002/03).

Both policy and procedure need to be carefully scrutinized by policy developers sensitized to disability to ensure that organisational barriers can be identified and eradicated.

In case an organisational barrier has been overlooked, a 'feedback' mechanism needs to be in place to identify the barrier. A method of addressing it then needs to be implemented (Burger, 2002/03).

Positive policies, practices and procedures

A starting point for the creation of positive policy development is an Access Action Plan, which assesses current policies, identifies problems and provides recommendations for improvement. Key aspects of this process that need to be implemented within the organisation are:

Awareness

Developing a culture of change

A supportive and educated organisational environment (Thornton, 2000)

Creating flexible organisational structures.

One of the key problems of organisational barriers is demonstrated in the inability of an organisation to respond flexibly to an immediate situation, in which a disabled person may find him or herself. This may be due to an existing malfunctioning policy or procedure that is not related to a disability issue. For example, current practices may cause a large queue of service users to build up. This may be due to staff shortages, complicated administration procedures, or untrained or unhelpful staff that are responsible for serving disabled and non-disabled service users alike.

A flexible response from an organisation concerned would be to deal with the disabled person as a matter of priority, ahead of other people who are not disabled (Thornton, 2000).

As indicated in the chapter dealing with policy and legislation, one of the rights of citizens outlined in the Constitution is an environment that is not harmful to a person's well-being (Republic of South Africa, 1996). Environmental barriers are a direct cause of disability discrimination, as explained in the research report.

7.7 Solutions to environmental barriers

Removing environmental barriers in a comprehensive and safe manner would therefore be the primary requirement however, this process would require a thorough understanding of the interaction between human function as it relates to disability and the built environment. Both building owners and built environment practitioners need to understand the range of issues involved, for instance:

Building examinations should be undertaken to identify the problems that disabled people experience. However, this must be done by professionals who have appropriate qualifications in access consultancy and possess information on how this field would relate to disability. There are, however, many other issues involved, such as the issue of the cost involved in the creation of the inclusive environment. While this is understandable, it is the view of the researcher that if the following factors are taken into account then the cost of modifying the built environment is significantly reduced.

Practices and procedures that relate to the built environment

Practices and procedures that relate to the built environment, include, but are not limited to, the following areas: fire egress, health and safety (Imrie, 1996). There are likely to be numerous other local practices, which will include parking arrangements, security arrangements and practices, and those that relate to environmental or building use. Any of these may result in an environmental barrier (Imrie, 1996). It would be

critical in this endeavour to ensure that all practices and procedures that may cause environmental barriers should be reviewed. For this process to be possible, barriers should be identified and recommendations made to remove them.

Proactive maintenance-management:

Many environmental barriers are created by maintenance-management schedules that are not implemented thoroughly or regularly. For example, loose paving presents an environmental hazard to both people with visual impairments and mobility impairments alike. A programme of action that requires regular maintenance of surfaces will remove this type of barrier and prevent further barriers developing in the future (Hammerman & Duncan, 1974).

Providing auxiliary aids or assistive devices:

The provision of auxiliary aids or assistive devices, such as temporary ramps or temporary modification to stairways to ensure the safety of visually impaired users, may be the most reasonable, cost-effective solution to an environmental barrier in the short term. It is important to recognise that such short-term alterations should be safe for the users concerned and for other people using the building. Whether the use of temporary assistive devices is acceptable in the long-term should be investigated by the organisations affected (Goldsmith, 1999).

Inclusive building modifications:

Structural environmental barriers are frequently more complicated to remove, but can be designed out when an area is upgraded. Building modifications should at a minimum comply with the relevant accessibility standards enforceable at the time the alteration is undertaken (Goldsmith, 1999).

Making building modifications can be expensive, but there are frequently inexpensive alternatives that can be investigated during a thorough building analysis. Many modifications that are necessary for the safe accommodation of disabled people have little cost outlay, fit simply and neatly into a maintenance management programme, and result in a safer, more convenient and comfortable living environment for everyone, whether disabled and non-disabled. Modification costs of existing facilities can be reduced with careful planning (Gibberd, 2001).

Integrated new-buildings:

The additional costs of including facilities that will accommodate disabled people in new designs are likely to be as little as possible of the overall cost of the development. If facilities for disabled persons are not included in the original design, it can cost significantly more to adapt the facility later. It therefore pays to start planning early on in the construction process (Gibberd, 2003).

7.8 Further recommendations

Dropped kerbs to footpaths:

Interruptions in footpath kerbs and edges are important cues that are very useful for partially-sighted people. However, should there be any interruptions that occur; this must be indicated with tactile paving (Foster, 2000).

Stairs and ramps:

Whenever handrails are provided, only a bright colour must be used, contrasting with the surroundings. In addition, a minimum distance of 300 mm is recommended to be beyond the top and bottom of the ramp or stairs in order to give a visually impaired person a chance to feel them before encountering the hazard. Staircases must also have bright contrast in colour, and should preferably have non-slip edges It is also advisable to incorporate a tactile warning surface into the floor at the top and bottom of the staircase or ramp (Vickers, 1988).

Walkways:

As visually impaired people use less of their sight (if they are partially sighted), it is crucial for walkways to be fitted with visual signs as well as tactile clues, for example, Braille blocks that can be used as route finders. The edges of paths and routes must also be made clear by using different colours and textures. It would also be advantageous to use plants to emphasise pavement edges; however, when used care must be taken especially in the choice and placement of plants so as to avoid people tripping over them (Pellegrino, 1990). It would be much better to avoid having large featureless paved areas in front of buildings, as these are more likely to

cause glare problems for visually impaired persons which could result in difficulty for them to distinguish entrances. Patterns in the paving should be carefully designed and placed to guide people through routed areas or to entrances. It is also recommended to avoid regular bands of colour at 90 degrees across narrow pathways as visually impaired persons can easily mistake these for steps (Golledge, 1997).

Hazards:

With regard to hazards the most obvious are windows and doors that open outwards, and could easily hit people who do not know they are there. One solution is to recess outward opening doors into a porch. Another important thing is to make sure that street furniture, trees, lamp posts, fire hydrants, waste bins, flower tubs, and seats are located at one side of pathways and roads that are used by the public. However, some of these can also be grouped together with a change in paving surface texture and colour that would give some warning on approach (Butler, 1997). It is important to note that the use of contrasting colours can be of great help to visually impaired persons, especially on street signs or lamp posts. A contrasting band at eye level should be incorporated onto the posts. Warnings or signs should be placed higher than 2 meters if they are not to present a danger, whereas low barriers must be placed around temporary road works so that a person using a cane can detect the hazards (Acredolo, 1995).

Tactile objects:

As it has been made clear throughout the report that the sense of touch is important to visually impaired people, and objects which are important in daily life must be able to be differentiated in shape, texture or size (www.surrey.ac.uk, 2005).

Signs:

Planners must always install signs in contrasting colours. In order to accommodate visually impaired people, raised letters and characters must be used to allow blind persons to feel the signs. Where possible, universally accepted symbols and colours should be used, for example, green for safety, yellow or amber for risk and red for danger (Klatzky, 1996). A clear and consistent system of signs must be used throughout a building, with a similar height and format whenever the direction changes. Signs must always be placed at eye level when mounted on the wall.

Hedges and trees:

Plants can be hazardous to visually impaired people, and so must be maintained to prevent them from encroaching onto footpaths; while low branches that are hanging over footpaths must be removed immediately (Imrie, 1996).

Doors:

As most partially sighted people have the problem of differentiating things if the colour does not vary, it is advisable to always make sure that the use of colour to differentiate doors from surrounding walls is applied. A colour contrast between a door and a door frame, with the door handle in a distinct tone, can serve a crucial purpose to people with visual impairments. Furthermore, a bright colour must also be applied on glass doors particularly at eye level to prevent partially sighted persons bumping against them (Franklin, 1992).

Corridors and circulation:

All appliances and fittings should be recessed where possible (Butler & Bowlby, 1997).

Lifts:

It is important to use raised numbers with tactile indications on landings, to indicate the floor. In addition to this, buttons in the lift car must be marked with raised numbers and Braille and a voice synthesizer is important to any lift particularly those that are used for more than two floors as it can give information such as doors closing/opening, lift going up/down and floor level (www.independentlivintg.org).

CHAPTER EIGHT

8. Conclusion

This research report has attempted to answer the question: How can the way in which visually impaired people interact with the built environment influence or enhance approaches to planning and design of the built environment? It has already been indicated in the report that a human being has five main senses - sight, hearing, smell, taste and touch - which assist the human body to control and effectively use the surrounding environment. However, there is a common understanding that an absence of one of the five senses is more likely to make it difficult or almost impossible for the human body to perform its role with ease. I have argued throughout the report that the built environment can still be used effectively with the remaining senses to inform the missing sense. The intention of this research has been to examine the way in which visually impaired people interact with the built environment to influence or enhance approaches to its planning and design, and how the built environment as a means of informing its users can be constructed to suit visually impaired persons who use the space without sight. Another intention of the research report however is to consider what sighted people can learn from the non-sighted people about navigating the built environment.

In order to make my position clear, I first discussed the challenges and barriers that are encountered by visually impaired people in the absence of sight. The barriers discussed in this report are amongst others, structural barriers in the built environment, inaccessible service points, inaccessible entrances and poor interior and exterior design. The background offered also covered how the immediate and remote spaces are used by visually impaired people as well as the use of a cane for navigating the built environment. Various concepts and theories that have influenced in the way disability is understood in present times were also covered. These are the social and medical models of disability whose impact cost the society an enormous price. The essence of leaning toward the social model has also been made apparent as it advocated for the human rights perspective of disability.

The influence of those models on planning legislation has also been shown and how those policies in turn serve as a barrier in the lives of visually impaired persons. However, recommendations were made pertaining to how such policies could be modified in order to match the universal design standard as well as the Constitution of the Republic. For instance, that particular chapter has shown that the legislative framework concerned with the built environment in South Africa is comprised of three mechanisms that are interdependent - the National Building Regulations, the Building Standards Act and the South African Bureau of Standards (SABS) 0400 Code of Practice. In the above legislation, I have noted various deficiencies such as, for instance, the insufficient definition of disability which fails to meet the specific requirements of different disabled groups. The meaning of disabled has in the main been used to refer to physically disabled people only.

There are also loopholes for property developers as well as building professionals that make it possible to evade or ignore accessibility requirements. This has been like this mainly because the non-statutory guidelines of the SABS Code of Practice are not legally enforceable. This means that it is only when this code of conduct has been made binding that all the role-players and stakeholders can feel pressured to act accordingly.

A failure to cross-reference Part S with other relevant sections of the National Building Regulations as required is also a major concern, and has resulted in severe deficiencies and further loopholes, irregularities and misconceptions in the application of such regulations. In essence, the weakness and limitations of the legislation have serious implications, which, if not effectively dealt with, can undermine the constitutional mandate to provide an environment that is not harmful to a person's well-being. It is also likely that the suggested amendment of all discriminatory pieces of legislation is also likely to remain unmet.

The resolution of the challenges noted in chapter 3 would in all respects greatly assist in the creation of the elements that are crucial even to visually impaired people as discussed in chapters 4 and 5. In fact, the elements of the built environment as outlined in these chapters served as suitable elements for illustrating how to make the

built environment navigable by visually impaired people as well as highlighting the necessary and relevant qualities for such area.

The analysis of the interviews took into consideration the information included in all chapters of this report and then made recommendations. In fact, the chapter dealing with recommendations outlined aspects that should be taken into consideration in an ideal situation in all the constructed environments so that the provision of reasonable means of access for all people is ensured. This should apply from the boundary of the site or parking to the entrance/exit of buildings. The purpose of access should be to free and encourage movement throughout the constructed environment with sufficient space for visually impaired people and convenient ways of moving from one point to another.

In essence, no part of the built environment should be designed in a manner that excludes certain groups of people on the basis of their disability. This means that all people with or without impairment should be able to, without assistance, approach, enter, pass to and from, and make use of an area and its facilities without difficulties. Thus, the built environment must be designed in such a way that the visually impaired people navigate without fear of hazard to life and health.

The writer's main argument throughout the report has been that it is possible to design a built environment which is sensitive yet artistic and which could effortlessly integrate the access and mobility needs of all people. However, for this to be achieved, differences must be embraced throughout the entire design process rather than as an afterthought or additional features. This has been made clear in a universal design document that addresses the range of accessibility by calling for the various relevant institutions to make all elements and spaces accessible and usable by all people to the greatest extent possible (Mace, 1990). Thus, a proposed approach could be affected through thoughtful planning and design at all stages of any design project. Of importance also is the fact that, lessons learnt from the detailed information in this research report should be able to assist the relevant authorities as well as any none-disabled reader to understand the implications of space to various groups of users, and the manner in which creativity for this purpose could be applied.

APPENDIX

Questions asked as part of data gathering.

A Mobility and Orientation instructor from the institution that serves blind people have been engaged in order to gain a deeper understanding of Mobility and Orientation. The participants consisted of seven people who were totally blind (no vision) and five people who were partially sighted. All respondents either stayed in Pretoria Urban Area or within a few kilometres from the inner city.

The totally blind respondents consisted of two females and three males, aged between 20 and 35 who had been blind between two and 35 years. Three of the totally blind interviewees were cane users and two were guide dog users. The partially sighted interviewees consisted of three females and two males, aged between 23 and 30 who had been partially sighted since birth and used their remaining vision to navigate.

The orientation and mobility training of the blind and partially sighted interviewees varied considerably. However, the majority of participants had received orientation and mobility training after becoming visually impaired, which also include rehabilitation, guide dog or cane training and the learning of routes to places of relevance in their daily lives. Only two partially sighted individuals in this particular study had received no orientation and mobility training.

A staff member responsible for teaching Mobility and Orientation at the Optima College for the blind was engaged in an endeavour to source out what and how Mobility and orientation works and its relevance in the navigation process.

Questions/?

1. What is Mobility and Orientation?
2. What are Mobility and Orientation techniques applied in the navigation of routes by blind people?
3. Does the application of Mobility and Orientation guarantees one's safety in this process?

4. Are Mobility and Orientation techniques applied differently by totally blind and partially sighted people and or those who had learnt it later in life.
5. Are guide dogs usefulness comparable to the Mobility and Orientation techniques?

Another set of questions had been prepared for active blind navigators of the built environment.

How do interviewees understand and differentiate between different spaces of the built environment?
A response to this question spoke to the characteristics of the environment as understood by blind people.

What are the places of importance that interviewees usually visit? E.g.: Hospital or school.
The researcher wanted to gather information regarding areas that are affected by one's independent or dependence.

What are the crucial sources of knowledge of where they are positioned in space?
When asking this question the researcher wanted to understand the spatial knowledge of the interviewees as well as the application of that knowledge, including what basically informs such understanding.

What and how do interviewees apply other senses in the absent of sight when navigating the built environment?
The researcher wanted to know other senses used, how and when it is necessary to use them.

How do interviewees understand Mobility and Orientation and how useful has it been in the navigation process?
The researcher found it important to get the views of the visually impaired people on the Mobility Orientation and its technique's strength and weaknesses.

Do interviewees usually apply other strategies and/or techniques except the Mobility and Orientation once?

It was also important to understand if there were other strategies that the interviewees preferred over Mobility and Orientation.

What do interviewees understand as barriers/obstacles in their navigation process?
The main objective of this research report is to learn from the blind people experiences and therefore, the researcher deemed it fit to establish what served as barriers to the blind navigators when they navigate the built environment.

What would be the interviewees ideal built environment that could better accommodate their understanding and effective use of the built environment?
After understanding what interviewees viewed as barriers, it became apparent that there was a need for a betterment of the built environment for its effective use by these interviewees, which is why the researcher wanted to understand changes or modifications that interviewees thought that if they could be installed then the built environment could be navigable by blind people.

What sort of feelings is induced by the nature of the built environment as they understand and make use of it.
It was clear that the interviewees where disgruntled with the current state of the built environment, and so what the question seek to explore was the direct and indirect consequences encountered by blind users of the built environment.

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