TRIBHUVAN UNIVERSITY

INSTITUTE OF ENGINEERING

PULCHOWK CAMPUS

Thesis No: 076/MArch/017

Accessibility in Public Spaces for People with Disability: Prospects for a Barrier-Free Public Built Environment

By

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A THESIS

SUBMITTED TO THE DEPARTMENT OF ARCHITECTURE

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR

THE DEGREE OF MASTERS IN

ARCHITECTURE (M. Arch.)

DEPARTMENT OF ARCHITECTURE
LALITPUR, NEPAL

SEPTEMBER, 2022

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I hereby declare that the thesis entitled **"Accessibility in Public Spaces for People with Disability: Prospects for a Barrier-Free Public Built Environment"** which is submitted to the Department of Architecture, Pulchowk Campus, Institute of Engineering, Tribhuvan University. in partial fulfillment of the requirements for the degree of Masters in Architecture (M.Arch.) is a research work carried out by me, under the supervision of Prof. Dr. Sudha Shrestha, between *March, 2022* to *September, 2022*. I declare that the work is my own and has not been submitted for a degree of another University.

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The undersigned certify that they have read, and recommended to the Institute of Engineering for acceptance, a thesis entitled **"Accessibility in Public Spaces for People with Disability: Prospects for a Barrier-Free Public Built Environment"** submitted by **Sebi Nakarmi** (076/M.Arch./017) in partial fulfillment of the requirements for the degree of **Masters in Architecture**.

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ABSTRACT

Disability is a massive global phenomenon that is causing increasing local, national, and global concern. Over six hundred million people worldwide are disabled in some way. As a result, accessibility in built environments is crucial for a variety of reasons. Most of the time, planners and architects do not view accessibility as a fundamental requirement. Through accessible, functional design, the barrier-free concept encourages freedom.

Additionally, the focus on ensuring universal accessibility has been rising in order to facilitate everyone's participation in social and communal activities. It is evident that accessibility for everyone grows every day throughout the world. Accessibility is undoubtedly a crucial component of social sustainability. Numerous studies have shown that excluding people from the built environment leads to discrimination and the loss of opportunities for social integration. Accessibility is thus the ability to engage in social interaction. From a practical standpoint, accessibility is a significant issue that won't ever truly go away, but it can be improved with the help of awareness on the part of everyone involved. Accessibility has grown beyond its initial narrow use because we now have greater knowledge of the architectural restrictions that exist in the world than we had at the start of the twentieth century. It should not be overlooked that ensuring everyone's accessibility will raise people's quality of life.

The objectives of the study are to investigate the current status of public spaces and built environment in the historic urban core of Patan, Nepal, through field visits, surveys & interviews. It aims at assessing accessibility features in public built spaces in the urban area of Patan, Nepal. It is based upon comprehensive observations of infrastructures through site analysis and photography with a focus on the access audit of old and new public open spaces and buildings. It shall also incorporate interviews with experts in the subjects, authorities and building managers to understand the scenario and mindset of the people in-charge. The study's conclusions may serve as a guide for engineers, architects, planners and managers in creating a built environment that is secure and inclusive to all.

Keywords: Accessibility, Universal design, Public space, Urban design, Social inclusion

ACKNOWLEDGEMENT

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PwD   Persons with Disability

PwPD   Persons with Physical Disability

WwD   Women with Disability

UD   Urban Design

POS   Public Open Spaces

CBS   Central Bureau of Statistics

WHO   World Health Organization

CHAPTER 1.   INTRODUCTION

1.1   Background

Most ideally, the goal is to create the most optimal state possible, where there are no directional, practical, sensory, auditory, environmental, or navigational obstructions, in an environment where all things are equal. Many people who we consider to be capable would unconsciously accept and use design elements that promote the use of nature and provide greater clarity, security, and utility for everyone in such a world (Shah, Shar, Khoso, Akhund, & Soomro, 2018).

In addition to attempting to incorporate style into these central considerations, the general outline was developed from slightly older inclusive concepts, the vaster barrier-free advancement, and adaptable and utilitarian development. The life expectancy of people with prominent wounds, illnesses, and genetic defects is improving thanks to modern medicine and future advancements, which is fueling an increasing enthusiasm for widespread planning. There are many businesses where people with children, wagons, moving equipment, pregnancies, baggage, or people with medically distinguishable ailments are considered for better user-experience, but there are many others where it has not yet been embraced to any significant degree. Additionally, a broader framework is being linked to the design of invention, path, facilities, other products as well as environments (Shah, Shar, Khoso, Akhund, & Soomro, 2018).

Disability is a circumstance, not a wonder. Everybody experiences these phases occasionally or at some point. The elderly, sick, pregnant, large, young, and people with gear can be depicted as people experiencing an interval of disability. Even so, the right to live in dignity during such times is possessed by each and every person. Thus, planning professionals' commitment to a barrier-free outline doubles as their social responsibility.

Today, not every person can enter a building or an office successfully. Even for a group of people—children, the elderly, women, and people with disabilities like those who use wheelchairs, shopping carts, or child buggies, etc.—finding a place in a developed environment is occasionally still an incomprehensible problem. The United Nations' policy that "No piece of the developed condition ought to be defined in a way that rejects certain groups of individuals based on their incapacity or frailty" is logically inconsistent with the situation in question. Two terms—"openness" and "portability,"

which need to be taken into consideration—are conveyed to us by the standard for outlining and organizing the developed condition. Here, the word "accessible" refers to the goal of empowerment (Blackman, et al., 2003).

The concept of universal accessibility refers to access, both structural and attitudinal, through the removal of barriers and the creation of environments that are practical for all potential users. Universal accessibility is essential to inclusion because it gives everyone a sense of autonomy, competence, and independence that enables them to use all areas of a space and actively engage with friends and family (ALACD, 2008).

1.1.1 The Importance of Functionality, Accessibility, and Safety

The concept of a barrier-free plan is relatively new; it emerged within the last 10 years as an augmentation of the "framework for the disabled," that primarily addressed the portability concerns of wheelchair clients. The availability problem has been seen from a broader perspective, but it is still firmly focused on the needs of those who are disabled. As a result, it is now understood that many different clients, many of whom are physically fit, suffer from a variety of regularly unintentional artificial boundaries as a result of ignorance and lack of information (Evcil A. N., 2012).

Mobility should be a feature of man-made habitat because it is an aspect of fundamental rule of law and liberty. Mobility is described as "a dominant organizing force in architectural design" by renowned urban planner Edmund Bacon. "From this perspective, if the city is accessible to everyone, mobility must be provided." In an accessible setting, wheelchair users, visually impaired people, or old aged people are not considered disabled; however, if accessibility is not offered, even a normal person may become disabled. The situation is described as follows: "They are disabled because the building's architect failed to foresee their needs or did not care about them" (Evcil A. N., 2012).

Besides that, there is an increasing growing focus on ensuring universal approachability and utility, which is necessary for everyone to take part activities in a society or communitiy. Accessibility is undoubtedly a crucial component of social sustainability. Numerous studies have shown that discrimination happens and chances for social integration are lost when people are excluded from the built environment. Accessibility is therefore the capacity for social interaction (Evcil A. N., 2012).

Wars in various parts of the world contributed to an increase in the population of PwDs. The World Health Organization (WHO) also noted that around five hundred million

people, or ten percent of the world's populace have some kind of physical or mental affliction. (Esfandfard, Wahab, & Amat, 2020). People with disabilities are given equal opportunities under United Nations regulations, and policymakers and activists can address matters related to disability by using the framework of international human rights to create guidelines for running programs that promote equal access for everyone. Numerous studies and authors place a strong emphasis on environmental vulnerability while ignoring the needs of PwDs and the importance of accessible environments globally.

Thinking about accessibility and urban design philosophies is the best process to create comfortable built environments. The formation of suitable indoor and outdoor amenities for the advantage of all societal sectors, which also includes PwDs, is a requirement for community development. Convenience while using public facilities by specific demographics of citizens, like the elderly, pregnant women, and people with disabilities, may be hampered by physical barriers. Designing for people with disabilities is essential because they frequently face unique and obvious access issues in urban areas. The needs of people with disabilities must be taken into account, and obstacles that prevents PwDs from enjoying the available facilities must be removed. It is believed that by implementing UD standards, people with disabilities could obtain their rights to a city that is more hospitable and comfortable for them, reducing their dependence on others (Esfandfard, Wahab, & Amat, 2020).

1.1.2 Accessibility and Universal Design Debate

Everyone should have equal access to everything. People with disabilities will never be fully integrated into society if they cannot utilize the facilities and services offered by the community (United Nations, 2007). This definition encompasses the freedom to choose how to enter, approach, interact with, or utilize a situation. Alignment, freedom, movement, profession, societal incorporation, financial independence, shift, and transformation should all be aspects of access. The quality of life for those with disabilities will undoubtedly improve with flexible and inclusive settings, secure and unrestricted experience in public open areas and amenities, structures, and other facets of ling in an urban community. Before planning, designing, and renovating built environments that allow for simple, independent, and comfortable movement, it stays crucial to recognize the needs of PwDs and know that they aren't an unvaried group and comprise of a variety of physical and mental conditions. Different disability groups

not only require different mobility arrangements, but diverse specifications must be into consideration (Caglayan, 2008).

According to its definition, universal design entails creating environments and products that are, to the greatest extent possible, usable by everyone (Christophersen, 2002). Additionally, it has been described as a design for all strategy. This has a lot to do with conversations about diversity and social inclusion in people. The overall goal remains the upgrade of physical and societal milieu, which will decrease demand for different accommodations and special mechanization (Meshur, 2013).

The universal design concept, according to Asmervik (2002), is simply a mindset or approach of looking at matter where environments, structures are created in a way that it can be utilized efficiently by everyone. A facility is considered accessible if a wheelchair user can enter it; however, the location of the entrance in relation to the accessibility of public transportation was not thought to be a factor. The universal design idea encompasses accessibility and participation broadly. Additional crucial aspect of UD is the general requirement included in development and design, making it affordable as well (Meshur, 2013).

Imrie (2000) states that as the emphasis on an inclusive strategy to create inner and outer aspects of built and social setting has increased, discussions about the significance of accessibility have also increased. This has led to the development of accessibility and universal design (Barnes, 2011).

Regarding PwD involvement in public, technical, occupational, and financial events, accessibility is unquestionably a crucial issue. From this angle, it makes sense to consider accessibility to be a fundamental human right. The environment should be free of all physical and architectural impediments, and spaces that promote communication should be created for PwDs. PwDs hold the right to demand those liberties as well as the right to take part in a variety of social, cultural, and amusing activities. Designing unique areas and structures exclusively for people with disabilities is neither sensible nor practical. Therefore, when planning a project, the accessibility factor should be considered, and the necessary preparations should be made (Seyyar, 1999).

1.2 Statement of the Problem

Many people today struggle to enter a building or an office. The UN's policy that "No piece of the developed condition ought to be defined in a way that rejects certain groups of individuals based on their incapacity or frailty" is logically inconsistent with the

situation in question. Two terms—"openness" and "portability," which need to be taken into consideration—are conveyed to us by the standard for outlining and organizing the developed condition. Here, the word "accessible" alludes to the goal of empowerment (Shah, Shar, Khoso, Akhund, & Soomro, 2018).

Rapid urbanization has an adverse influence on many issues, including access to, use of, as well as the physical and functional structures of public spaces. Urban settlements' public spaces fall far short of the modern standards of more affluent cities, especially in developing economies (Pasaogullari & Doratli, 2004). In urban areas, there aren't many disabled people who can move around independently. This clearly demonstrates how little disabled people participate in urban life and social interactions, and how limited their opportunities are to move independently (Meshur, 2013).

The research's aim is to ascertain the issues that people with disabilities face in urban settings. The main issue is that there is a lack of access for PwDs to the amenities provided in public areas because of the design-related barriers brought about by the built environment. The accessibility of physical spaces to people with disabilities, their use of those spaces, and their exit from those spaces, as well as accessibility restrictions and issues with urban spaces, are discussed in more detail. To determine if the standards for accessible design have been implemented, the current state of Patan's public spaces is observed. The study group consists of orthopedically and visually impaired people who, when compared to other impairment groups, face more challenges when navigating urban spaces.

1.3   Rationale of the Research

According to a number of disability studies, there are a number of social barriers that prevent PwDs from being fully integrated into society, including an inaccessible built environment (Wiman and Sandhu, 2004), a lack of knowledge about the policy-making process, deficiency of employment opportunities, and unsatisfactory levels of public awareness on the rights of people with disabilities as well as their abilities. Public spaces in Nepal have made very little progress toward accessibility for people with disabilities because of flaws in the system that implements designs and a lack of enforcement. There is a knowledge gap that could be bridged by advocates, the government, and leaders in the field of accessible design practices.

This study can fill a void in the literature on the level of satisfaction among PWD and inaccessible architecture by elucidating the cognitive aspects of accessible design. In a developing nation like Nepal, examining these elements can serve as a catalyst for the public and policymakers to move toward accessibility and inclusiveness during the design, adoption, or implementation phases. This initiative aims to increase awareness of the need for normative standards for people with disabilities among the PWD community, local built environment professionals, policy makers, and other stakeholders.

1.4   Need of Research

This study is essential for soliciting support and providing guidance for the efforts being made by the world's developing nations to adopt universal accessibility features in the areas of policies and practices. Authorities, planners, and designers working on the design of the public built environment will use the study's findings, along with the body of prior research, as a guide when creating training sessions, seminars, and workshops with a specific goal in mind. The results of this study may help establish and normalize the trend toward accessible design, which will eventually result in a beneficial outcome on both national as well as international levels.

The results of this study will also aid in an improved perception and comprehension of the standpoints of PwDs and those who are directly impacted by disabilities. This understanding will help policy makers, business stakeholders, and advocates in development and implementation of appropriate policies for creating a healthy as well as livable environment for PWDs. In the end, this study will help the city progressively transform into a more inclusive community.

1.5   Importance of Research

People frequently perceive the geography of towns and cities as oppressive, and this is due to both the neglect of their accessibility needs and the positive affirmation of ableist values developed by developers and engineers. The result has been labelled as an "architectural apartheid":

Therefore, underground stations are "no-go" areas for people with mobility issues because they lack elevators. The utilization of mobile stairs in communal facilities also prevents elderly, frail as well as people with vision impairment from using them because their ability to judge distance and speed is impaired (Blackman, et al., 2003).

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Similar language is used to describe the risks posed by modern city environments:

Here, one must negotiate a continuous, complicated flow of traffic that includes pedestrians, cyclists, and other vehicles, as well as signals. The need for self-control and alertness cannot be overstated. Losing control can have fatal consequences. It becomes commonplace and required for someone using public areas to be able to use their bodies in specific ways for moving through space (Blackman, et al., 2003).

The importance of accessibility has increased as a result of disabled people's advocacy efforts, the political influence of an aging population, and more accepting attitudes toward disability in general. The formation of inclusive settings is described as a conventional issue for planning policy and practice in a recent UK Government Green Paper. For those deemed to have physical or sensory impairments, specific developmental standards, design and construction laws intend to avert or diminish the lack of accessibility in public buildings and transportation (Blackman, et al., 2003).

However, there are still significant issues regarding the limit, viability as well as application of this system. According to Gant (1997), pedestrianization has significantly improved the user-friendliness of shopping centers for PwDs over the past few decades. However, there are still significant issues, such as inadequate restrooms and a lack of signposting, that need to be addressed. Imrie and Kumar (1998) use the personal narratives of people with disabilities to show how the architecture exacerbates their perception of social and economic marginalization. The division of locations into those that are harmful and dangerous and those that are safe and secure was a recurring theme in the informants' accounts. The milieu outside one's residence was frequently seen as unsafe and hazardous, whereas the home was frequently thought of as safe and secure. Outside of the home, humiliation was a common occurrence, for example having to use alternative doors at the rear or side to enter buildings or facing tall countertops in businesses. Frequently heard was the statement, "No one really cares about the needs of PwDs, and we experience this every time we come of our houses" (Imrie & Kumar, 1998).

The 1995 Disability Discrimination Act of the United Kingdom is one example of legislation designed to combat disability discrimination. The guiding principle behind this legislation is that sensible modifications must be done to guarantee that individuals with disabilities aren't significantly at a disbenefit in comparison to the population without disabilities. PwDs must not be treated unfavorably because of a reason related

to their condition. On both of these counts, the outdoors is probably going lack practical modifications that has the potential to render public built environments accessible to people with disabilities (Blackman, et al., 2003). The process of identifying the necessary changes and translating those into novel development and architectural specifications for the barrier-free urban setting is just getting started (Blackman, et al., 2003).

1.6 Research Objectives

The objectives of this research are to evaluate the current status of public spaces and built environment in the urban context of Patan, Nepal, surveys & interviews. It aims at evaluating accessibility features in public spaces in the study area. The case studies are built on in-depth observations of accessible provisions, conducted in old as well as new public open spaces and buildings. Investigations are undertaken to assess the degree of authorities' and building managers' familiarity with UD concept and their views on existing and forthcoming building accessibility strategies.

The study focuses on PwDs and their requirements as well as ascertain the accessibility of the current architectural and urban design, the complications PwDs encounter in the city and also considers suggestions and solutions to those problems, which could be utilized in the planning and creation of inclusive environments. The study's conclusions may serve as a guide for engineers, architects, planners and managers in creating a built environment that is secure and inclusive to all.

1.7 Research Questions

The questions outlined below are examined to achieve the study's objectives. The current study considers four research questions in light of the problems:

1.   What attributes do public places have that are universally recognized as "accessible" for people with vision and mobility impairments?

2.   What is the level of compliance to guidelines in existing condition of public spaces and problems in implementation of the guidelines?

3.   What issues do people with disabilities face in public spaces in the study area?

4.   What measures could be implemented in the present or future to alleviate the existing complications in the study area?

1.8   Research Paradigm

This research is grounded in applied theory and a mixed-method approach that employs qualitative and quantitative techniques to evaluate how satisfied people with disabilities are with the existing condition of built-environment of public spaces as well as the application of accessible features in accordance with best practices in the study area. Combining qualitative and quantitative research should have significant advantages, allowing for the comparison and contrast of results and the development of much deeper insights, given that both types of research provide essential understanding (the Why and the What).

This study's methodology is based on non-exact science because it involves a more individualized approach to data collection and analysis that primarily emphasizes contextual and social factors. This method emphasizes reality and existence, so the philosophical paradigm is classified as post-positivism.

The research topic is inter-subjective because different members of the community have different opinions about how important accessible design is. Therefore, a framework that combines the various viewpoints is required in order to further examine and comprehend the opinions held within the community. The goal of this study is to learn how to efficiently gather opinions on the use of accessible design for Nepal's development.

Since opinions based on personal experiences may differ among people, this research adopts a probabilistic approach in which the truth is sought in its most probable form. This research cannot be interpreted as a 100% truth from an objective standpoint because different community members may have different views depending on their knowledge and experience.

Reality's nature, existence, and relationships are described by ontology and the ontological premises. The research's ontological claim is that people's perceptions of accessibility may change based on their background knowledge and life experiences. The sufficiency and legitimacy of the various types of knowledge that are possible serve as the basis for epistemological assumptions (Blaikie & Priest, 2018). This study aims to shed light on public perceptions of accessibility and seeks to pinpoint any gaps in legislation and practical limitations. In light of the fact that people's thoughts are the best indicator of what they think about the adoption of accessible design, this research suggests that we examine people's thoughts.

1.9 Research Methodology

Structured and unstructured interviews with PWDs, domain experts, authorities and building managers are used to gather the data. Data collection for this survey was done using the snowball sampling technique. "Snowball sampling," a non-probability sampling approach, uses present study respondents to help find new survey respondents.

In order to better understand the design needs of the PWDs in Patan, questionnaire surveys are conducted. A thorough assessment of availability and condition of accessible features in the study area has been conducted through empirical field studies.

The study compares PWDs' and experts' responses to determine whether they agree or disagree with what should be included in governmental policies and regulations, educational curricula, and workplace practices to improve accessibility. The conclusions derived from this research will advance the body of work and research of universal design, particularly in developing nations.

The information gathered from interviews is assessed using a combination of content analysis and thematic analysis techniques. The most popular and simple technique for analyzing qualitative data is content analysis. At its most basic level, In order to find patterns across several bits of information or communication resources as well as within one piece of data (such as phrases, words, or graphics), content analysis is utilized. For instance, a collection of news articles or speeches. We can determine how frequently a concept is discussed or shared using content analysis (Warren, 2020).

A data set, like a collection of focus group or interview transcripts, can be analyzed thematically to look for patterns of meaning. Using similarities, or topics, a thematic analysis divides data sets—which are typically rather large—into groups. These patterns aid in our comprehension and interpretation of the data (Warren, 2020).

With the use of in vivo coding, a style of qualitative analysis of data that highlights the participants' original stated remarks., the analysis is carried out using the inductive coding method (grounded style of coding where codes are derived from data). In the first cycle coding technique known as "in-vivo coding," which is used in qualitative analysis, codes are created straight from data. Compared to other approaches where

codes are derived by the researcher, in vivo codes use the language and terminology utilized by the participants. The emotions and actions of participants can therefore be faithfully represented by codes. Using in vivo coding, researchers can fully comprehend the direct narratives, ideas, and interpretations that informants actually convey (delvetool.com, n.d.).

1.10   Thesis Outline

A thorough literature review is required to fulfill the research's goals and objectives by enlightening the reader on the subject of universal accessibility and related design specifications. It is accomplished using the following methods:

1.10.1 Collection of Data, Literature Review and Case Studies

The fundamental idea of universal accessibility and its significance are examined in the study. Therefore, a review of the relevant literature is done in order to understand the research topic clearly. It is investigated how accessible design is currently practiced in Nepal, as well as the shortcomings of the current laws and public perceptions of accessibility in general. The scenarios from other developing nations are also included in the literature study.

1.10.2 Field Study

A modest but significant quantity of studies have been conducted in the last decade to help people with disabilities express their experiences on their own. The conversational methods that have been used in a large portion of this work to explore themes and issues rely on gentle prompts. The importance of speaking with PwDs directly is emphasized because they are "experts of their own experience." Different strategies are required for this kind of research than for focus groups or one-time surveys. Due to the value of compassion and close associations in gaining access to the perception of PwDs, it must be conducted informally. Disability research requires a collaborative approach where PwDs, authorities and researchers jointly explore challenges and solutions.

In this study, a questionnaire survey has been used to investigate how people with disabilities feel about urban public spaces and how they have improved in relation to UD. The study is carried out primarily through first-hand interviews, questionnaires, observations and secondarily through internet sources of files, articles, e-books and

published papers. This study involves visits of several public buildings and open spaces in Patan, questionnaire survey, and unstructured interview with the experts of relevant fields, authorities and with the users of accessibility features. With the aim of unveiling the present condition of accessible features, a questionnaire survey is carried out with local PwDs so that every aspect of the issues can be envisaged from the perspective of the PwD.

The following data collection methods are used in empirical field studies in the case study field: Semi-structured interviews with wheelchair users, including those who use them independently and with assistance, with those who care for them, with people who are visually impaired. According to Sawyer and Bright (2004), an access audit's goal is "to assess a particular system's performance in terms of accessibility and usability for a variety of possible users, including PwDs, and also to propose improvements to accessibility provisions." The gaps between the urban design intervention and the experiences of wheelchair users in public spaces are revealed by access audit and users' responses on some chosen points, including accessibility, internal mobility, activity, and users' comfort.

PwDs with visual and motor impairments are the participants that were selected through purposive snowball sampling. Utilizing a method known as purposive sampling, the researcher can select participants based on how well they relate to the study's questions.

With the participants' consent, the one-on-one interviews are conducted in a semi-structured method and documented by means of an audio recording device. Throughout the interview, notes are also taken for additional documentation. Following transcription, the audio recordings and transcripts are used for analysis of the collected information. Responses from the interviewees are contrasted with information from expert interviews and earlier studies.

The survey focuses on two groups of PwDs who are thought to experience more difficulties when utilizing barrier-free urban public spaces. The categories are wheelchair users and blind people. The methodology used for this study is category-based sampling. A five-point Likert scale with the options of highly dissatisfied, dissatisfied, neutral, satisfied, and highly satisfied is used to evaluate the responses to the factors. Likert scales give respondents the option to express their opinions in

addition to providing a simple yes/no response, and the quantitative data can be easily analyzed. The research methodology employed is both qualitative and quantitative assessing the readiness and appropriateness depending on infrastructure and operational specifications for individuals with impairments..
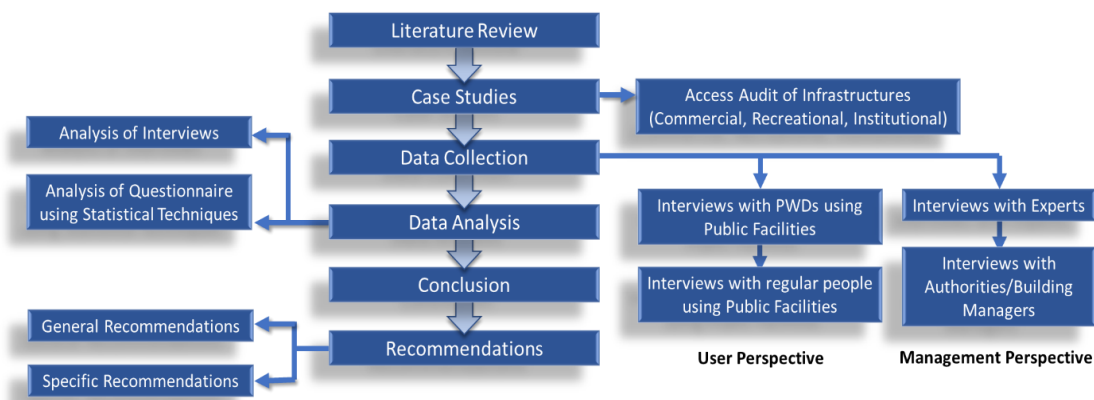
Figure 1-1 Method of Study

1.10.3 Main Constructs of Questionnaire and Field Study

The statistical descriptive analysis was used to evaluate how comfortable people with disabilities felt in the research area. According to their perceptions and experiences of comfort while using public spaces, they were asked to respond to questionnaires.

This study's second goal is to evaluate public spaces in the core area of Patan in terms of their accessibility for PwDs. To assess accessibility of the physical environments, the UN Design Manual is referred to monitor employment of urban design standards in the public realm. This manual was chosen because it has a target audience that includes people with all kinds of disabilities and because the majority of the advised actions have been tried out in developed nations. The groups in its manual are as follows:

Urban Design Considerations

1. Obstructions

2. Signage

3. Street Furniture

4. Pathways

5. Curb Ramps

6. Pedestrian Crossings

7. Parking

Architectural Design Considerations

1. Ramps

2. Elevators

3. Lifts

4. Stairs

5. Railings and Handrails

6. Entrances

7. Vestibules

8. Doors

9. Corridors

10. Rest Rooms

1.10.4 Research variables and operational definition

In the context of this research, accessibility is the dependent variable, and the availability, standardization compliance, and convenience of the public built environment are the independent variables. In relation to these factors, the technical terminologies are as follows:

i.   Accessibility is the availability of a path for everyone, including PwDs, to achieve equal opportunity in all spheres of life and livelihood.

ii.   Availability is defined as having PWD access.

iii.   Conformity is the presence of accessible facilities in public areas that adhere to technical standards and guidelines.

iv.   Convenience is disabled facilities in public areas does not affect user satisfaction.

1.10.5 Analysis, Discussion and Results

To compare the circumstances of other countries to Nepal, information from literature, national case studies, and international case studies is used. Then, a suitable collection of strategies and suggestions is created to effectively reduce the obstacles faced by PwDs in the context of Nepal. Following are the stages of analysis to be carried out:

i.   Determine whether there are any PWD accessibility features available.

ii.   Assess accessibility compliance in light of disability and standardized guidelines.

iii.   Use the knowledge of form, dimension, color, and texture to assess how convenient accessibility is.

iv.   Contrast the findings of the site observation with those of the questionnaire survey and interview results.

v.   Use the findings to generate suggestions for reducing accessibility obstacles.

1.11   Scope and Limitations

The urban areas of modern cities change over time. Public spaces that were previously single-purpose are now multipurpose and equipped with cutting-edge technology. Public space includes not only open parks and squares but also the interiors of publicly accessible buildings like hotels, offices, malls, and places of worship. The current study has a few limitations that should be mentioned. Due to the broad subject, it has been restricted to two categories of disabilities: orthopedic impairment and visual impairment. Selective public buildings and open spaces have been studied while taking time constraints into account because qualitative analysis is a labor-intensive approach. Due to their eligibility for the general trend of shaping public space in contemporary cities, the study areas presented here can be considered to be representative of all public spaces in Patan. Statistics on the total number of professionally employed architects in Nepal, particularly in Patan, are lacking. Thus, data for this survey were gathered using the snowball sampling technique. It is accurate to say that this study provides insight into design attitudes in Nepal, despite the fact that it is only one and its findings should not be extrapolated. In order to provide PWDs with UD solutions in urban public spaces, the study's findings are analyzed.

1.12   Study Area

Public areas serve as the city's living spaces, where residents congregate to socialize, communicate, and carry out daily activities. They help people feel connected to the city and define the city's character. Public spaces that are welcoming and convenient promote the city's vitality and livability. Public spaces need to be maintained and given

attention if they are to remain comfortable and livable. WHO estimates that 10% of the global populace is disabled, and the UN Convention emphasized that PwDs have equal rights to utilize and benefit from public open spaces and buildings.

The third-most populous city in Nepal, Lalitpur, must increase accessibility and facilities to fulfill the requirements of PwDs who want to participate fully in society. The Central Bureau of Statistics of Nepal estimates that 513,321 people in Nepal are classified as PWD, 4934 of whom reside in Lalitpur. While 818 people have low vision or are blind, there are 1669 (or 3.57 per 1000) people who are physically disabled (1.75 per 1000). The research setting, which is the historical core of Patan, is 1.22 sq.km in area and 5445.57 m in perimeter.

Analyzing the necessity for public spaces and building in Lalitpur for PwDs is one of the objectives of this study. It assesses how accessible public structures and outdoor areas are for people with disabilities in Lalitpur, Nepal. A total of 50 PWDs from Lalitpur have been interviewed through category-based snowball sampling.
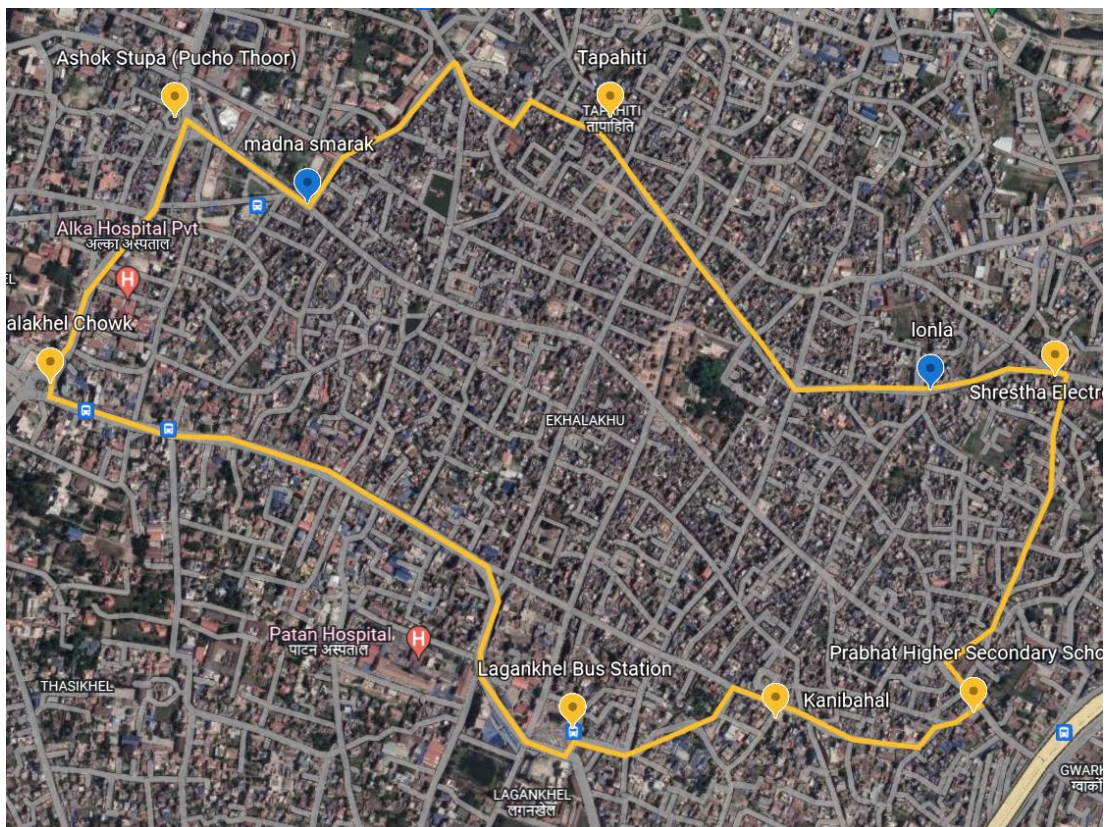
Figure 1-2 The Historic Core of Patan, Nepal

CHAPTER 2.   LITERATURE REVIEW

2.1   Disability

2.1.1   Classifications of Disability

- Physical

o   A body part that is damaged, deformed, or disfigured

o   Complete or limited damage of a body-part.

o   Existence of potential pathogens in the human body.

o   The presence of pathogenic organisms within the physique.

- Cognitive

o   The loss of all or some of physical or intellectual abilities.

o   A condition or fault that causes the person to learn in a different way from someone who doesn't have it.

- Sensory

o   Complete or limited damage of a person's physical or intellectual capabilities.

o   Issues with malformation or disfigurement of a body part.

- Social/Emotional

o   Ailment, disease, or sickness that impairs the ability to think, perceive

reality, feel, or make decisions, or that causes disturbed behavior.

Disability is a constantly changing notion which arises from the contact of PwDs with environmental as attitudinal obstacles which prevent complete and equal partaking in societal activities. These definitions demonstrate that the concept of disability is not static (Syaodih & Aprilesti, 2019). Disability status is solely influenced by the impairment and by environmental factors:

▪   Individual factors (sex, age, coping mechanisms, societal status, literacy, occupation, former and present experience, personality).

▪   Environmental factors (social and legal structures, societal attitudes, architectural features).

This interaction among human functioning and environment is out of balance, may result in activity limitations and participation restrictions (Syaodih & Aprilesti, 2019).

2.1.2   Disability in Nepal

A person who is physically and/or mentally incapable to live a regular life is considered to be disabled, according to Nepal's constitution. The World Health Organization (WHO) defines disability similarly, referring to impairments, activity restrictions, and participation limitations. The term covers people with restricted mobility as well as those who have hearing and vision impairments. Seven different categories of disability were identified in the 2011 Nepalese Census Report (CRN) (Thapaliya, 2016).

1. **Physical disability**: Partial or complete loss of physical function; issues with nerve or muscle use or movement; and issues with the structure or function of bones and joints, including cerebral palsy, arthritis, and amputation.

2. **Vision-related disability**: Where a person's vision is compromised and cannot be fixed. An individual is deemed blind if they are unable to see clearly with both eyes at a distance of 10 feet, whereas someone who is unable to see clearly with both eyes at a distance of 20 feet is deemed to have "low vision."

3. **Hearing-related disability**: a condition that prevents a person from hearing sound or the rise and fall of sound. Anyone who is unable to hear sounds louder than 80 decibels is considered to be deaf. One is said to be hard of hearing if they can hear sounds between 65 and 80 decibels.

4. **Deaf-Blind**: a person who suffers from hearing and vision impairments.

5. **Voice and speech-related disability**: This is distinguished by muddled speech and pointless word and letter repetition.

6. **Mental Disability**: where a person exhibits abnormal brain activity. Three groups are:

• If a person lacks intellectual development before the age of 18 and is unable to perform tasks appropriate for their age or environment, they are referred to as intellectually disabled or mentally retarded.

• A person is said to have a chronic mental illness if their mental illness prevents them from carrying out their daily activities.

• Autism is a condition in which a person is unable to exhibit typical behavior and communication patterns (through the use of language) or when they repeatedly engage in the same behavior.

7. **Multiple disabilities**: when a person has two or more impairments. Four broad categories were developed by the New Educational Research Association (2001) to categorize disabilities. Communication, mobility, mental, and complex disabilities are among them. Each category is further defined in the table below:

Table 2-1 Classification of Disability

Source: (Thapaliya, 2016)

Communication disabilities	Visual disability	Hearing impairment	Speech impairment
Locomotion disabilities	Mobility Impairment/Physical disability	Manipulation (working) disability Where an individual is unable to perform the daily activities of life due to a physical deficiency in upper limbs, he has a manipulation disability.	
Mentally disabilities	Intellectual Disability	Epilepsy Where a person suffers from frequent attracks of unconsciousness and displays certain symptoms such as tongue biting and foaming from the mouth.	Chronic mental illness
Complex disabilities	Overlapping Where a person has more than one type of disability.	Cerebral Palsy Where an individual is unable to conduct daily physical activities due to muscle impairement or brain damage .	

Although there are many different categories for describing disabilities, the discussion in this study is informed by the seven categories from the 2011 CRN that were mentioned above. The following table and graph show how people with disabilities are distributed throughout Nepal (CBS, 2011).

Table 2-2 Statistics of PwDs in Nepal

Sex	Types of Disabilities								Total
	Physical	Visual	Hearing	Deaf-blind	Speech	Mental	Intellectual	Multiple	
Male	108,279	47,041	41,204	4,803	33,190	16,787	8,280	20,502	280,086
Female	78,178	47,724	38,103	4,633	25,665	14,210	6,608	18,114	233,235
Total	186,457	94,765	79,307	9,436	58,855	30,997	14,888	38,616	513,321

Source: (Thapaliya, 2016)
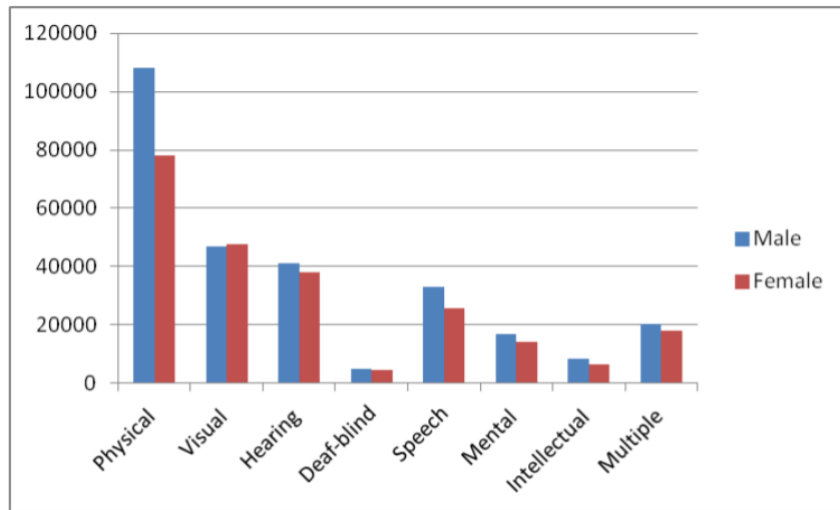
Figure 2-1 Disability types in Nepal

Source: (Thapaliya, 2016)

As per CRN, 2011, there were 513,321 PwDs in Nepal overall, with 280,086 men and 233,235 women. There were seven different types of disabilities included in this: physiological, visual, deaf-blind, speech, psychological, and several disabilities. According to the statistics, there are ten times as many physically disabled people as there are intellectually disabled people (Thapaliya, 2016). The data on people with disabilities in each district of Nepal is listed below. Data was obtained from the 2011 CBS National Census (National Federation of the Disabled, Nepal , 2015).

Table 2-3 District-wise Population of PWDs

Source: (National Federation of the Disabled, Nepal , 2015)

District	Male	Female	Population with Disability	Percentage of PwDs
Kathmandu	9,144	7,978	17,122	0.98
Lalitpur	2,621	2,313	4,934	1.05
Bhaktapur	1,652	1,552	3,204	1.05

The number of disabled people worldwide is rising, according to numerous research reports. This might be due to the usage of better statistics gathering methods, but it likewise draws attention to a problem. The official 2011 census data for Nepal shows a disability rate of 1.94%, but many organizations believe the true number to be much higher. For instance, it is predicted that 10% of the world's populace is currently

20

incapacitated (World Bank, 2000). Furthermore, because of cultural customs, a deficiency of comprehension on how to define disability, and added social and economic issues, it is difficult to gather precise figures regarding the occurrence of disability in Nepal. Hindu religious customs hold that one's sins from a previous life are to blame for one's current life's advantages and disadvantages. In other words, it is believed that a person's disability is the result of their past lives' sins. Similar to this, people frequently conceal their disabilities as a result of various sociocultural norms, values, and pressures. The actual number of disabled people in Nepal, according to researchers, policymakers, developers, global and national organizations involved in the disability fields, is much higher. They blame the recent earthquake, the 10-year Maoist conflict, poverty, inadequate medical and maternity care facilities, and geographic variations (Thapaliya, 2016).

2.1.3   National Policies on Disability

The policies regarding disability that are approved in Nepal are examined in this section. It gives a brief overview of the national policies and laws governing people with disabilities.

The advent of the Constitution of Nepal in 2015 marked a substantial advancement since it stated that general legislation cannot be applied inequitably based on a person's race, ethnicity, creed, clan, sex, sexual orientation, personal features, wellness, physical impairments, marital status, pregnancy, state of the economy, dialect, or location (Thapaliya, 2016).

The government of Nepal has provided facilities and rights for the disabled in nine major areas, according to an examination of its disability rules, laws, and guidelines:

1.   Identity cards: Identity cards for people with disabilities are provided, and they are characterized as per type of impairment (red, blue, yellow and white). The district office has cards available.

2.   Free education: Educational establishments are not allowed to demand payments for students with disabilities, and some educational accommodations are created, for example, allowing students with visual impairments to use an assistant during exams.

3.   Scholarships: The administration is resolute to make sure that a range of subsidies, including those for professional and practical training are available for children with disabilities. As per the kind and level of a person's condition, the government offers scholarships, with a 2% subsidy set aside for disabled students finishing their higher education.

4.   Medical care: Free medical examination services in healthcare for PwDs and free medical care for PwDs above 65 years of age.

5.   Workforce: The Nepali government has set aside 5% of all positions in the civil service for people with disabilities.

6.   Transportation: Disabled individuals are eligible for a 50% discount on transportation. Additionally, when a transport automobile has a capacity of 15 or more, seats must be set aside for people with disabilities.

7.   Accessibility: Every public building and location, such as a hospital, school, campus, or bus, should be handicap-friendly.

8.   Income tax and customs: In Nepal, people with disabilities are exempt from paying income tax. The government has also maintained that disabled people should have access to vehicles with no restrictions on their use, including 4-wheeled bikes.

9.   Social welfare and housing: People with complete disabilities receive NPR 1,000 per month in social welfare benefits, and people with other disabilities receive nature-dependent benefits. The government has also implemented measures to guarantee that people with disabilities, including children with mental impairments, have access to housing (Thapaliya, 2016).

2.1.4 International Policies on Disability

Concern over disabilities increased after the Second World War. Particularly after the agreement of the UN Charter (1945), the Universal Declaration of Human Rights (1948), and the Declaration or Rights for Disabled people in 1975, it aimed to reach and unleash the potential of disabled people. The UN stated in these documents that people with disabilities had their own rights to esteem, self-respect, civic liberties, political rights, financial rights and social security. Similar to this, the UN designated the years 1983 to 1992 as the decade for people with disabilities and encouraged governments and organizations to carry out a global "programme of action". The main

goals of the world program of action were to improve equal opportunity, disability prevention, and rehabilitation (Thapaliya, 2016).

The standard rules for equitable opportunities for disabled individuals as established by the United Nations discuss the need for accessibility to physical environment in Article 5. The Americans with Disabilities Act (ADA), a human rights agreement for PwDs living in cities in the United States, mandates access to the built setting (Polat, 1998). The ADA created a outline of law for PwDs, and it is considered the best system currently in place. As a general rule, the Americans with Disabilities Act (ADA) forbids marginalization of PwDs, particularly in the areas of profession, local, state, and federal government, communal spaces, and market settings, and also for accessibility in transport and telecommunications. The ADA's defensive instructions for PwDs are organized into 4 major categories: profession, local government and state activity, use of public transport as well as other areas of the community, and telecommunications services (Shah, Shar, Khoso, Akhund, & Soomro, 2018).

Additionally, the principles of the European Urban Charter are gathered underneath the heading "underprivileged and incapacitated people in urban areas." Towns and municipalities must be planned so that all residents can access all locations. Policies for the underprivileged and the disabled should promote integration rather than overprotecting them. Collaboration with and among specialized associations that speak for underrepresented or minority groups is crucial. Making sure that homes, offices and other places of work are properly modified to the needs of the underprivileged and impaired is crucial. For all people, communication, travel, and public transportation must be accessible (Meshur, 2013).

National priorities include encouraging active living and social inclusion, especially for PwDs. For the purpose of supporting PwDs in leading active, healthy lifestyles, organizations like the Active Living Alliance for Canadians with Disabilities (ALACD; 2005) or the National Center on Physical Activity and Disability (NCPAD; 2008) are established. These organizations guarantee indiscriminate accessibility in opportunities for physical activity for everyone. The definitive objective of these establishments is to develop physical activity settings and potentials that not only comply with the minimum requirements for universal accessibility but are practical and serviceable to PwDs as well (Goldman, 1991).

2.1.5   Sustainable Development Goals

The need to lessen disability inequality was m-entioned in Sustainable Development Goal No. 11. Although not yet ideal, this equality exists in urban public spaces. The accessibility of public spaces for people with disabilities is still insufficient. 2019 (Syaodih & Aprilesti)

One of the declarations that requires consideration of people with disabilities in every plan is the Sustainable Development Goals (SDGs). The target in Point 11.7 of the SDGs program on Sustainable Cities and Communities states that by 2030, provision of worldwide access to secure, inclusionary, and accessible public spaces, particularly for females and children should, the elderly and PwDs should be made available. Currently, one of the issues in our cities is the lack of appropriate urban public spaces for people with physical disabilities. If the areas of our residence, the amenities we utilize, and our localities are made to be inclusive as well as accessible, the built environment can help create a society that is more equal, inclusive, and cohesive (Syaodih & Aprilesti, 2019).

Around a billion individuals, or 15% of the global populace, have an impairment; 80% of them reside in developing nations. Anywhere from a hundred and ten million and a hundred ninety million adults struggle significantly to function. Because they have less access to medical services, people with disabilities often have unmet medical needs. Several factors, such as:

o   Insufficient information or comprehension, with authorities failing to understand the insinuations of design and the trials and dangers, can be blamed for the deficiency of accessibility to facilities for PwDs.

o   Deficiency of input from PwD users; PwDs were not included in the process of planning, designing, and implementing.

o   Missed Chances, with the potential to lose out on additional value for universal access (Salha, Jawabrah, Badawy, Jarada, & Alastal, 2020).

2.1.6   Participation in Planning and Design

Physically disabled people frequently complain that planners and designers do not consult them when making design decisions. Development and engineering professionals may view accessibility as a topic of making use of the right practical guidelines, which may cause them to overlook the usability of "accessible"

environments and other crucial details like the type of walking surface. It's critical that PwDs participate in studies as direct contributors as opposed to indirect recipients of design adjustments if we are to begin to close the knowledge gap regarding how to make the outdoors further accessible and convenient for PwDs.

One measure of a society's modernity is the inclusion of PwDs in socioeconomic life. The necessity to give PwDs the equal living environments as everybody else is the main factor—it even serves as a prerequisite. For people with disabilities to receive the care they need, the built environment must be properly planned (Maraz, 2009). Due to their disabilities, people with disabilities lead different lives from those who are able to, and they meet their requirements through various means. Moreover, it is illogical to assume that PwDs are only unlike those without disabilities in terms of their organs, and there may occasionally be a deficiency of essential talents or capabilities. It must not be disregarded that PwDs might not be capable of carrying out all of the tasks that everyone else can perform, but they are able to perform several tasks for which their conditions are not a barrier thanks to their unique capabilities, and they be helpful to community as well (Meshur, 2013).

The idea that PwDs are different from other individuals in any way besides mobility issues is flat-out false. PwDs might not be able to perform all jobs that everyone else can perform, but they can choose works that are suitable for them, making use of their skills and abilities, and doing so will advantage humanity as a whole. Additionally, it is a responsibility that should be fulfilled to give PwDs access to every advantage of social living. Against this background, it is important to conduct research on the factors that pose challenges for PwDs in urban areas (Meshur, 2013).

2.2   Importance Urban Public Built Environment

Public spaces serve a wide range of functions and are regarded as venues for intergroup social and cultural interactions. Urban public spaces must be capable of accommodating a variety of conduct, usages, and actions like errands, walking, talking, utilizing the amenities to enjoy, relaxing or spending time on a daily basis, as well as periodic celebrations and events (Meshur, 2013).

Every urban area is important for the interaction between people and their surroundings and for the development of one's own creativity. Only the basic necessities are accounted for in the rapid urbanization process. Urban environments and spaces that

weren't really suited for people and didn't meet their needs emerged as a result of this tendency. Designing with universal and barrier-free accessibility in mind is the most efficient way to create livable urban environments. In this situation, inclusive and pluralistic urban design principles should be used to promote the inclusion of disabled people in society. Large portions of cities and their structures, however, are inaccessible to those with disabilities. PwDs still face many challenges in using urban areas today (Meshur, 2013).

In general, the convenience of people with disabilities has not been taken into account when creating public spaces. Due to the absence of accessible public spaces and special facilities, there continues to be some discrimination against PwDs. Furthermore, the public's perception that PwDs are second-class citizens who respect their requirements and civil liberties can only exist if the first-class society (normal society) has thrived (Aini, Marlina, & Nikmatullah, 2019).

2.3   What is Accessibility?

Accessibility signifies having access to everything. Accessibility does indeed refer to "an overarching concept for all parameters that affect human functioning in the environment" according to a technical definition. A well-planned city is thought to be functional and easily accessible for everyone. Today, creating livable cities is a hot topic for many urban planners. There is general agreement that accessibility and people's mobility are important elements in designing livable cities. In light of this, one of the useful interactions in a public area is accessibility. According to social theorists, accessibility is a fundamental social right (Kitchen and Law, 2001). In the UN Conventions, where equal prospects for all are promoted in every spatial structure for communal use, accessibility is a core value of urban design (Evcil, 2010). Because of the previously stated justification, accessibility is necessary for all members of society, irrespective of their stage in life, capability, or position in society, for them to take advantage of the public facility (Evcil A. N., 2012). Since moving around an urban area securely, autonomously and expediently is essential to urban life, everyone must be able to do so. According to this definition, a disability is any limitation or inability to perform a task that can be remedied by a suitable design. To accomplish this, it is thought that architects will apply their knowledge of various user needs more effectively in the real world (Evcil A. N., 2012).

2.4   Accessible Design

Design that complies with established applicable regulations for use by PwDs is known as accessible design. It can isolate PwDs from the vast majority of consumers and make them feel like an outsider because it is frequently accomplished by offering distinct specifications for "special" user groups. These solutions, which are occasionally added to current designs or new structure at the end of the design process, can be prurient and expensive. Accessible features that are later

Figure 2-2 Relationship between accessible, adaptable, transgenerational, and universal design

added show that the designers did not take into account people with impediments until after the fact, frequently until required to do so by law (M.S., 2010).

Although universal design incorporates accessibility from the start of the design proce dure, it is less obvious because it is always accessible. Modifications to a standard design are known as adaptable design features, and they serve to make the design serviceable for a person as required (Center for Accessible Housing, 1991). Similar to accessible designs, adaptable design elements can occasionally appear gimmicky, stigmatizing, and expensive (M.S., 2010). Although adaptable strategies are occasionally used in universal design to achieve customization, it is best when all options are equally available.

Transgenerational design, also known as lifespan design, takes aging into account when creating products. Transgenerational design may not essentially address the full range of potential conditions or other variables that impact functionality like gender gaps, social background, and education level, as it doesn't directly mention hereditary circumstances or deviations that might occur as a consequence of an accident or disease. While some aspects of universal design are cross-generational, the strategy includes disabilities other than those that are age-related (M.S., 2010).

Therefore, universal design is accessible and sometimes adaptable across generations. The diagram shows how accessible design is divided into three categories: universal design, adaptable design, and transgenerational design. A design might fall into two of

these categories at times, and some designs fit into all three (M.S., 2010). Not every accessible design is universal. Some users are excluded by designs that are "accessible" but not "universal,". Of the three accessible design approaches, universal design addresses all forms of human variation and integrates accessibility into design solutions, making it the most inclusive and least stigmatizing (M.S., 2010).

Table 2-4 Additional Theories of Design

Source: (Carr, Weir, Azar, & Azar, 2013)

Design theory	Definition	Example
Accessible design [46]	Provides separate design features for user groups with disabilities Usually permanent and noticeable Fulfills code requirements for use by individuals with disabilities	Provide the minimum level of accessibility required by the local building code. This can vary by region (e.g., province or state), and with different building types within the same region. For example, Ontario Building Code requires power door operators (e.g., push button, automatic sensor, etc.) on entrances to hotels, but not on entrances to stand-alone office spaces of less than 300 m^2 [47].
Adaptable design [46]	Provides design features that are usable by groups with disabilities, however remain concealed or omitted until needed Features are either adjustable or easily and quickly added or removed in order to "adapt" the environment for specific individuals	An electronic push button is provided to open the door, but the use of the push button is optional (i.e., door will open manually).
Transgenerational design [48]	Develops products and environments that are compatible with the natural physical and sensory declines experienced during the aging process	Provide a power assist door, which augments the force applied by the user to fully open the door [49].

2.5   The Principles of Universal Design

2.5.1   Principle One: Equitable Use

The concept, that is also viable, can be used by people of all abilities.

<u>Guidelines:</u>

(1a) Offer all users the same means of use, either identical or equivalent depending on the situation.

(1b) Refrain from stigmatizing or grouping users together.

(1c) Ensure that all users have equal access to privacy, security, and safety features.

(1d) Create a design that will appeal to all users.

Figure 2-3 The Principles of Universal Design

Source: M.S. (2010)

2.5.2 Principle Two: Flexibility in Use

A broad range of personal preferences and skills are supported by the design.

Guidelines:

(2b) Allow access and use from either the right or left hand.

(2c) Aid in the accuracy and precision of the user.

(2d) Offer flexibility to accommodate the user's pace.

2.5.3 Principle Three: Simple and Intuitive Use

No matter the user's level of experience, knowledge, linguistic proficiency, or current level of concentration, the design is simple to use.

Guidelines:

(3a) Remove superfluous complexity.

(3b) Comply with user intuition and expectations.

(Sc) Take into account a variety of literacy and language abilities.

(3d) Group information according to importance.

(3e) Give prompting and feedback that is useful both during and after the task has been completed.

2.5.4   Principle Four: Perceptible Information

Regardless of the environment or the user's sensory capabilities, the design effectively conveys the necessary information to the user.

Guidelines:

(4a) Use various modes (visual, verbal, tactile) to present the same information in redundant ways.

(4b) Maximize the discernability of critical information

(4c) Distinguish between components in ways that are comprehensible

(4d) Make sure that different methods or tools used by individuals with sensory impairments are compatible with them.

2.5.5   Principle Five: Tolerance for Error

The design reduces risks and the negative effects of mistakes or unintended actions.

5a) Arrange elements to reduce risks and mistakes: make frequently used elements easily accessible; get rid of, isolate, or shield dangerous elements.

(5b) Issue cautions about risks and mistakes.

(5c) Offer features that can fail.

(5d) Assure conscious action when performing tasks that demand attention.

2.5.6   Principle Six: Low Physical Effort

The design is easy to use, comfortable, and causes little fatigue.

Guidelines:

(Ga) Permit the user to keep their body in a neutral position.

(6b) Employ reasonable operating forces

(6c) Cut back on repetitive actions.

(6d) Reduce sustained physical effort to a minimum.

2.5.7   Principle Seven: Size and Space for Approach and Use

No matter the user's body size, postural control, or mobility, the approach, reach, manipulation, and use are all accommodated with the proper amount of space and size.

Guidelines:

(7a) Give every user, whether they are standing or sitting, a clear line of sight to crucial components.

(7b) Ensure that any user—seated or standing—can comfortably reach all components.

(7c) Allow for variations in grip and hand sizes.

(7d) Make room for the use of personal aids or assistive technology (M.S., 2010).

2.6   Urban Design Considerations

(UNESCWA, 2004)

2.6.1   Obstructions

1.   Problem Identification

•   Things that obstruct the way and stick out in the way.

•   Overhanging signs that are low to the ground.

•   The absence of cautionary signage near obstacles.

2.   Planning Principle

To create an unrestricted path devoid of obstacles for independence as well as safety of PwDS, specially blind people.

3.   Design Considerations

General

•   Street maps, bollards, traffic, vegetation, sunshades, direction signs, billboards and street furniture are examples of obstructions.

•   Whenever possible, obstacles must be put outside the travel path.

•   Pathway obstructions ought to be simple to spot and, if possible, ought to be arranged in a single, uninterrupted line.

•   It's best to stay away from protruding elements.

•   A clear, unimpeded path should be at least 0.90 meters wide.

Obstacles on the surface of the roadway

For a blind person using a cane to navigate a pathway, the obstructions should include one of the three design elements:

(A) A straight line rising from the surface of the route.

(b) A 0.10-meter-high elevated surface.

(c) Ground-level tactile warning markers around the obstruction. At least 0.60 meters of the cautionary markings should be placed outside the estimated area at the foot of the barrier.
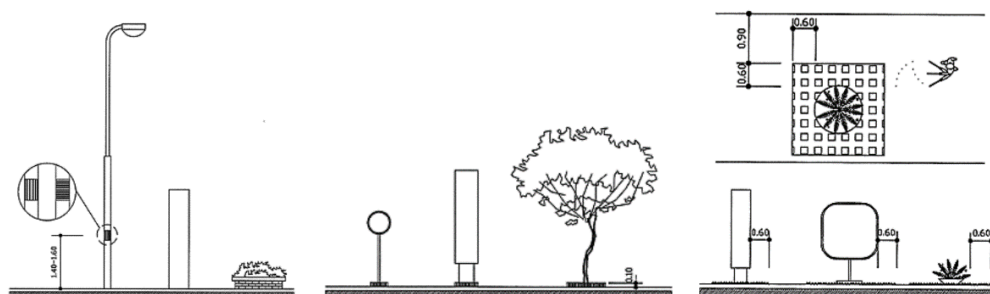
Figure 2-4 Obstructions on the pathway surface

Source: UNESCW (2004)

Overhanging obstructions

•   For a blind person to pass safely, overhanging signs in accessible pathways should be mounted at a minimum clear height of 2.00m.

•   Cut back overhanging vegetation to a minimum clear height of 2 meters.

•   The maximum distance that undetectable obstacles mounted lower than 2.00 m may project into the path is 0.10 meters. Otherwise, they ought to be hidden or recessed.
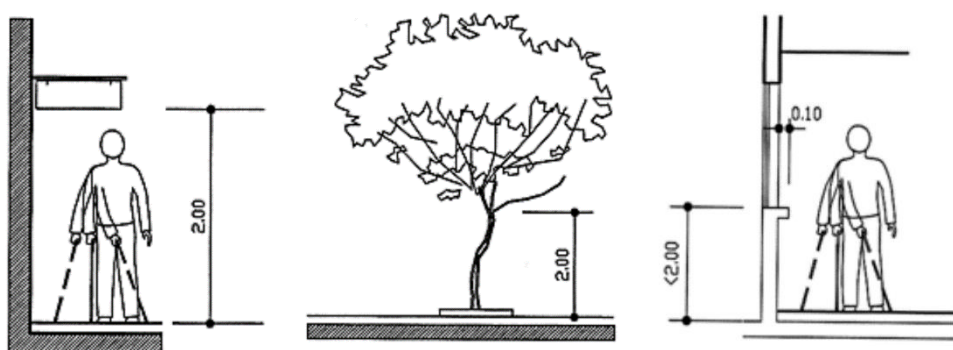
Figure 2-5 Overhanging Obstructions

Source: UNESCW (2004)

Fixed poles

1)   To warn pedestrians with limited vision, fixed poles should be equipped with contrasting durable color marking strips of at least 0.30 m length, positioned with the center line at a height between 1.40 m and 1.60 m.

Garbage bins

2)   To reduce collisions, trash cans attached to lampposts should face away from the path of pedestrian traffic. They should also be painted a bright color that is easy to see by people with vision impairments.

Spaces below ramps and stairs

3)   Spaces beneath ramps and stairs ought to be completely sealed off with safety rails, raised curbs, or a tactile surface.

Bicycle stands

4)   The location of bicycle stands should be on a raised platform.

Wires

5)   Wire netting and stabilizing wires must be painted in contrasting colors or obscured.

Bollards

6)   Bollards should be painted in a contrasting color or with colored stripes,

7)   There should be about 1.20 meters between guiding posts.

Roadworks

8)   Road construction and excavation projects create transient obstructions in the path of travel. For their safety, continuous barriers, scaffolding, and fences should be easily visible.

9)   To aid those with poor vision, barriers should be marked with striped color stripes and illuminated at night.

10)   The barrier height should range from 0.75 to 0.95 meters. There shouldn't be more than 0.10 meters between the bottom of the barrier and the surface of the pathway.
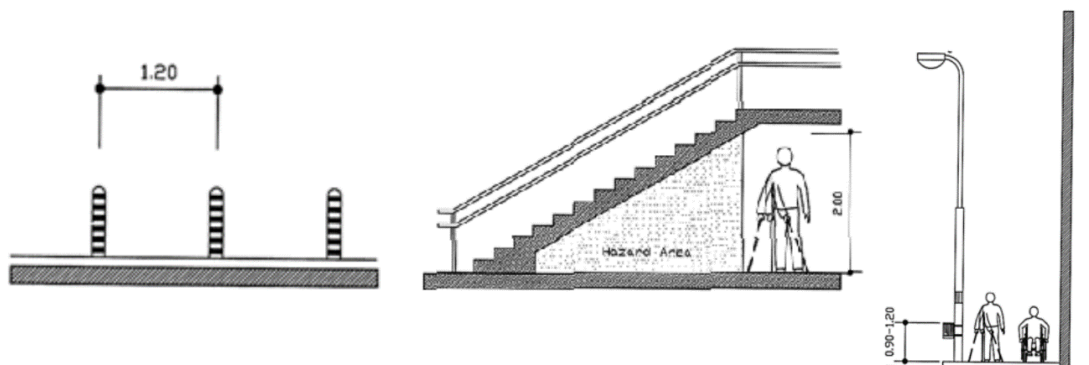
Figure 2-6 Roadworks

Source: UNESCW (2004)

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4. Existing Constructions

11)   Current obstructions in the path of travel should be redesigned to meet all the a forementioned specifications (UNESCWA, 2004)

2.6.2   Signage

1. Problem Identification

•   Difficulties with orientation brought on by unclear or absent street names, numbers, and/or directional signs.

•   Pedestrian accidents brought on by incorrectly placed signs.

•   risks brought on by a lack of warning signs and traffic lights.

•   Lack of mention of accessible facilities and access routes.

2. Planning Principle

To aid disabled people in their orientation.

3. Design Considerations

General

•   Directional signs, locality markers, street names and numbers, informational signs, etc. are all examples of signage.

•   All signs must be observable, unambiguous, straightforward, simple to read and understand, and properly lit at night.

•   Signs shouldn't typically be placed behind glass due to potential reflections.

•   Signage should be visible because it is considered an obstruction when it is placed in the path of travel for pedestrians.

 International symbol of accessibility

•   The universal accessibility symbol should be used to mark accessible areas and amenities.

•   The wheelchair figure forms the basis of the symbol, which also includes a square border or background.

- To distinguish the illustration from the background, use contrasting colors. White for figure and blue for background are the most frequently used colors.

- Always view the wheelchair figure from a drawing's right side.

- For fully accessible buildings, one interpretive sign at the entrance is sufficient.

Figure 2-7 International symbol of accessibility

Source: UNESCW (2004)

Direction signs

- To make it clear what kind of facility is available where, it should be indicated clearly with graphics or written directions.

- The number of directional signs does not need to be excessive, but they should be placed at the main doors and entrances as well as at locations where the level or direction changes.

Street names

- Street name fixed signs should be erected no higher than 2.50 meters.

House numbers

- House number signs should be fixed at a height of no more than 2 meters.

Maps and information panels

- Maps and information panels should be positioned between 0.90 m and 1.80 m above ground level at building entrances, alongside streets, and on public structures.

Installation

- Signs can be pole-mounted, suspended, or mounted on a wall..
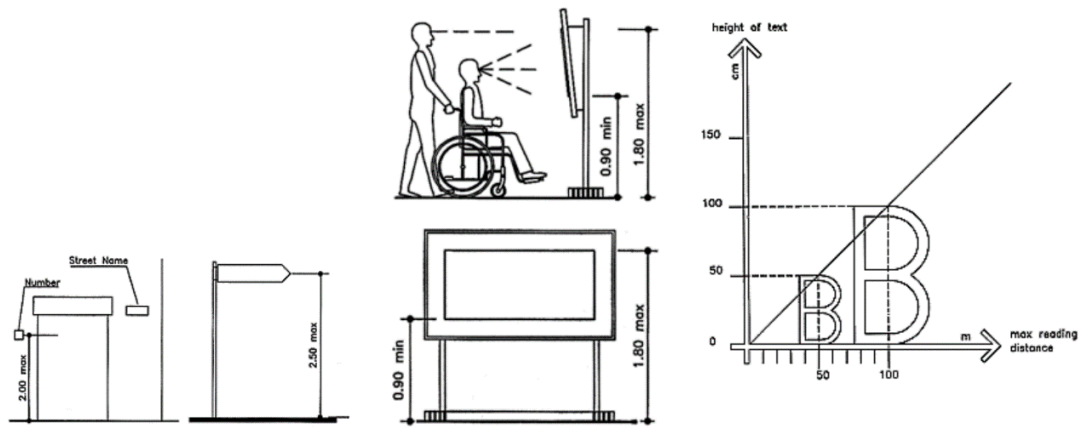
Figure 2-8 Installations

Source: UNESCW (2004)

Shape of signboards

• Signboards with information should be rectangular.

• Triangles should be used for warning signboards.

• Circular signboards should be used for interdictions.

Colour

• Signs need to stand out from the background in terms of color in order to be easily recognized.

• Yellow, red, blue, green, black, white, and other colors are frequently used.

• To prevent confusing color-blind people, avoid using the color combinations red/green and yellow/blue.

Surface

• Glare should be avoided by processing the sign surface.

• Unless they are colored, embossed texts should be avoided. Prints in relief are recommended.

• Text in Braille or in relief must be present on all key plans, orientation signs, and push buttons in elevators.

Lettering

- Letter size ought to be proportional to reading distance.

- The ratio of the character's width to height should range from 3:5 and 1:1, and the width to height of the character's stroke should range from 1:5 and 1:10.

- In order to allow people who are blind to read the message using the tips of their fingers, it is preferable for the letters and signs to be elevated at least 1 mm from the background.
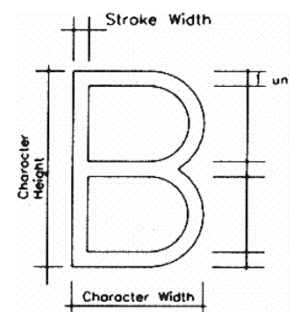
Figure 2-9 Lettering
Source: UNESCW (2004)

- Not less than 15 mm should be used for the smallest letter type.

- It is recommended to use standard distance between words and letters.

4. Existing Constructions

- To identify accessible areas and facilities, the universal symbol for accessibility should be added.

- There should be more directional signage to make it clear where accessible areas and facilities are located and what they are for.

- Any signs that do not adhere to the aforementioned design specifications should be changed or removed.

2.6.3   Street Furniture

1. Problem Identification

- Inadequate or missing street furniture.
- Blocked passageways.
- Unreachable street amenities.

2. Planning Principle

Design accessible amenities that are convenient for everyone while allowing pedestrians to travel freely along travel routes.

3. Design Considerations

General

Bus stops, benches, mailboxes, light poles, hoardings, telephone booths, public restrooms, newspaper kiosks, planting tubs, rubbish bins, and other items are examples of street furniture.

Location

• Placement of street furniture should allow for safe passage for everyone while avoiding hazards.

• Blind people can use surface texture variations on footpaths to locate public
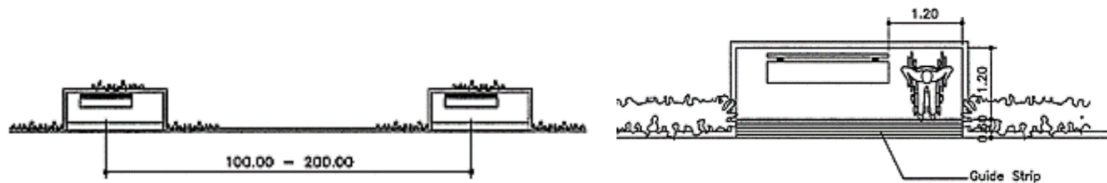
Figure 2-10 Location of Street Furniture
Source: UNESCW (2004)

amenities.

Resting facilities

• All pedestrians benefit from level rest areas with seats, but people with mobility issues especially so.

• They ought to be positioned wherever they are required, such as in front of accessible entrances and exits, at pathway crossings, outside the main circulation path, and in public parks and recreational areas.

• They should be available at regular intervals between 100 and 200 meters.

• There should be some seating near telephones, public restrooms, and other amenities.

• Rest areas with benches must provide a wheelchair with a minimum of 1.20 m of adjacent space.
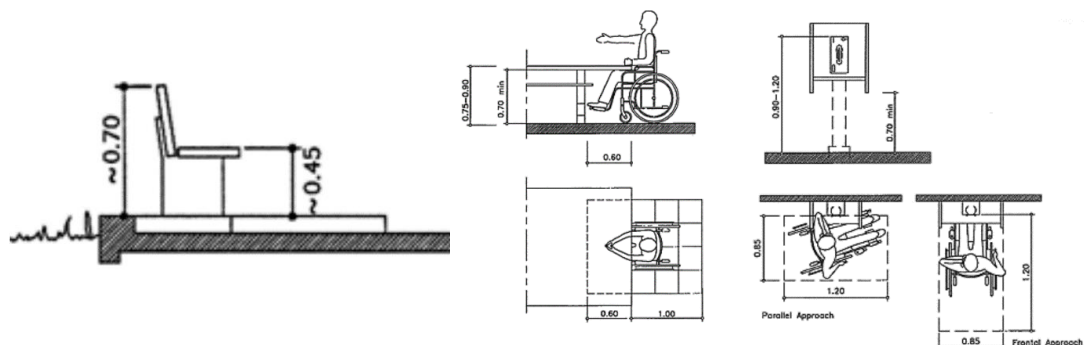
Figure 2-11 Resting Facilities
Source: UNESCW (2004)

- With backrests at roughly 0.70 m above floor level, public benches and seats should be positioned at a height of 0.45 m.

- A table should have a minimum depth of 0.75 m and a maximum height of 0.90 m.

4. Existing Constructions

- Wherever possible, rest areas should be rearranged to make room for a wheelchair.

- Facilities mounted up to a height of 1.40 m are acceptable; however, structures higher than that need to be altered (UNESCWA, 2004).
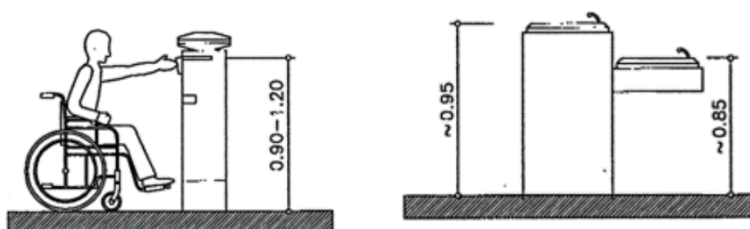
Figure 2-12 Existing Conditions
Source: UNESCW (2004)

2.6.4   Pathways

1. Problem Identification

- Uneven curbs with holes and obstructions.

- Interruptions in the travel path that are uncomfortable or dangerous.

- Not enough width.

- Alterations in level.

2. Planning Principle

To make sure all users, especially the blind and those with mobility issues, have clear, unobstructed, level, and spacious pathways.

3. Design Considerations

General

- Pathways or ramps include things like sidewalks, walkways through parks and other public spaces, pedestrian overpasses and underpasses, and pedestrian underpasses.

- In order to deter cyclists, pedestrian paths in parks and other public spaces should be regularly interrupted by visible barriers like plants or by realigning the path.

Guide strips

- An individual without sight should be able to easily identify the route by using a long, white cane. Travel routes can be identified with the aid of natural guide lines and guide strips.

- Orientation for blind pedestrians is made easier with the help of a guide strip, which is a line constructed in or on the road surface.

(a) To substitute for absent natural laws Fill in gaps in a guide strip greater than 0.00 m.

(b) To direct to crosswalks for pedestrians.

- To prevent confusing blind people, guide strips should be laid out in a clear and logical manner and placed far from manholes and drains.

- For the benefit of those with vision issues, guide strips should be a color that contrasts with the surface it is on.

- In order to avoid impeding those with mobility issues, the guide strip ridge profile must be flush with the top surface of the adjacent road surface and parallel to the primary direction of movement.

- Where travel routes turn, there must be a gradual shift in the guiding strip's direction.
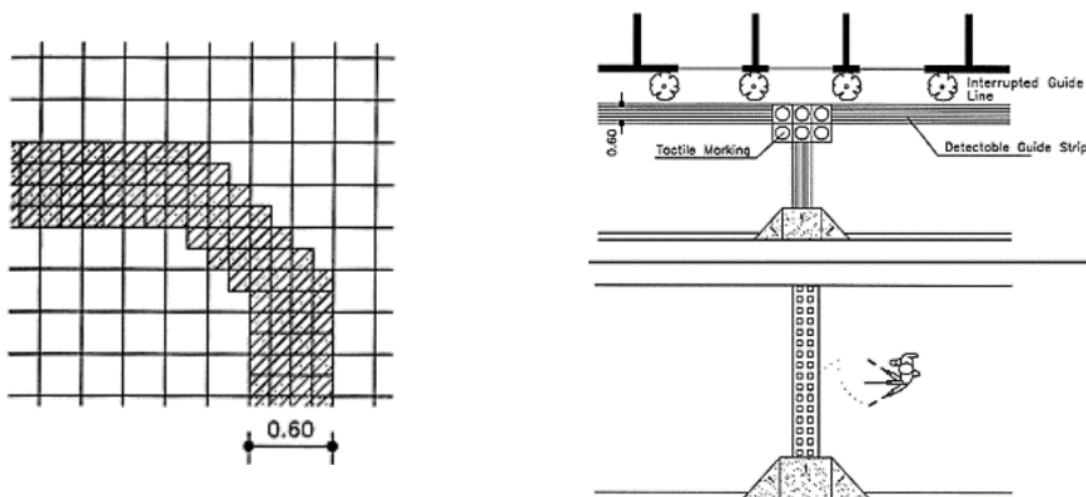
Figure 2-13 Guide Strips
Source: UNESCW (2004)

Tactile marking

- The following locations on the pedestrian path of travel should have tactile tiling:

(a) At a junction of guide strips or on a guide strip where alternate routes are available.

(b) At a crosswalk for pedestrians

(c) Around obstacles that the blind find challenging to detect

- At crosswalks where the route splits off into multiple directions, a tactile guiding area, preferably made of rubber tiles with minimum dimensions of 0.90 m x 0.90 m, must be built in a guide strip.
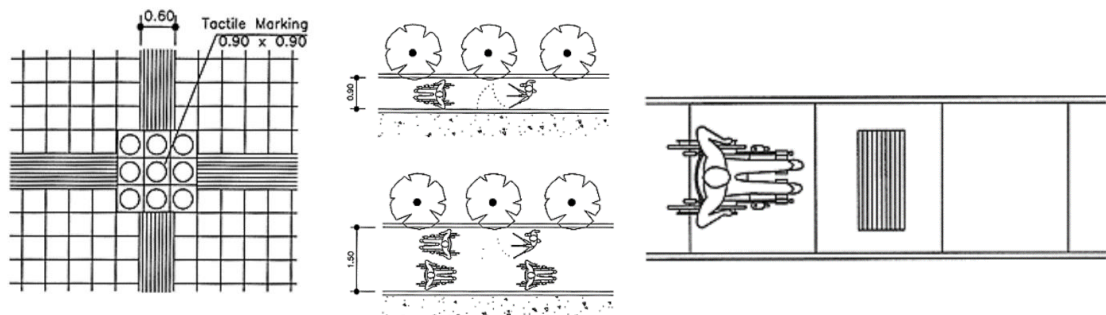
Figure 2-14 Tactile Marking
Source: UNESCW (2004)

Curbs

- A curb must be between 0.07 and 0.15 meters high.
- It is best to avoid stepped curbs because they are dangerous for all pedestrians, especially at night.

Curb ramps

- Curbs shouldn't block the passage of people with physical disabilities, especial ly wheelchair users.

Width

- A clear path should be at least 0.90 meters wide.
- A two-way wheelchair traffic pathway must be at least 1.50 meters wide. The ideal width is 1.80 meters.

Slope

- A path that is accessible shouldn't have a slope greater than 1:20. Any path that slopes more than 1:10 ought to be made into a ramp.
- A path's slope shouldn't be greater than 1:50.

Surface

- An accessible pathway should have a smooth, continuous, non-slip surface that is also even.

- For differentiation, pathways that are level and even with surrounding surfaces should have a varying texture and color finish.

- Crossing paths must merge at a single level.

Gratings

- Gratings can be dangerous for people who use wheelchairs, canes, crutches, parents pushing strollers, and women wearing high heels.

- Generally speaking, manholes, drains, and gratings should be positioned outside of the pedestrian pathway.

- Grates should have narrow patterns of no more than 13 mm and must be flush with the path surface.

- The path of travel for pedestrians should be parallel to elongated grating openings.

Guards

- Guards, upstands, or other types of barriers must be used when there are elevation changes of more than 13 mm between the path and the surrounding surface.

- Pathways should be kept clear of planting areas, swimming pools, and other landscape elements by guards that are at least 0.15 meters high.

- Anywhere there are level changes in between pathway and the surroundings between 6 mm and 13 mm, the edges of the pathw should be beveled.

Landscaping

- Care should be taken in selecting the plant species and areas along the route.

- Plants that are poisonous or thorny shouldn't be used close to walkways.

- Avoid plantings that drop seeds or leaves that can trip people up.

- Shallow-rooted trees pose a risk because they could push through the path surface.

4. Existing Constructions

- To prevent slipping and to alert people who are blind, existing pavement can be covered with rubber adhesive tiles with texture.

- Ramp up any curbs that are currently in the way of pedestrian traffic.

- If an alternate accessible route is available, existing paths with steps, stairs, or steep slopes do not need to be modified.
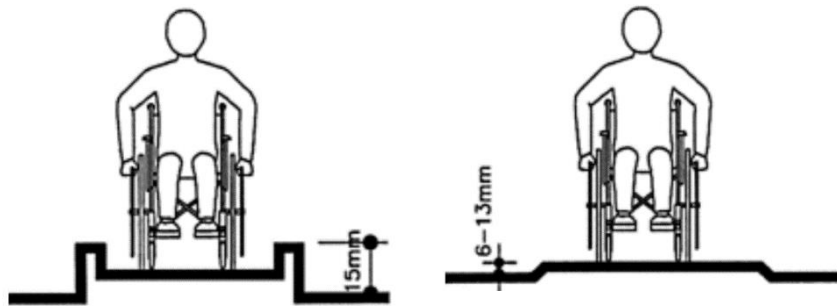
Figure 2-15 Existing Conditions

Source: UNESCW (2004)

2.6.5 Curb Ramps

1. Problem Identification

At pedestrian crossings and close to building entrances, there is an inadequate transiti on between the curb and the road or none at all.

2. Planning Principle

To eliminate variations in level on the pavement itself as well as between the paveme nt and the road surface.

3. Design Considerations

General

- Anytime there is a difference in level on pedestrian paths or cross paths, curb ramps are used.
- Curb ramps must be placed away from the usual path of pedestrian flow to avoid confusing blind pedestrians. The pathway's clear width must be at least 0.90 meters wide.
- Curb ramps ought to be placed far from areas where water collects.

Types

(a) Standard curb ramps: Cut back into the pavement and has flared sides to provide transition in three directions.

(b) Returned curb ramps: These ramps have a single-direction slope. If the sides are not secured, this could be a risky action.

(c) Built-up curb ramps: with typically flared edges
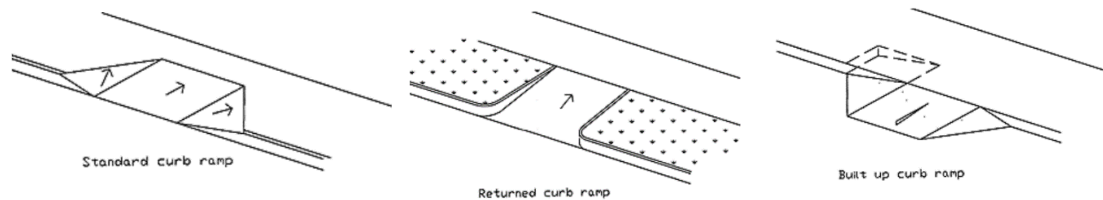
Figure 2-16 Curb Ramps

Source: UNESCW (2004)

Application

- At each intersection of a street's four corners.
- On opposing sides of the street, at each pedestrian crossing.
- At pick-up locations, close to building entrances.
- between paved paths and accessible parking.
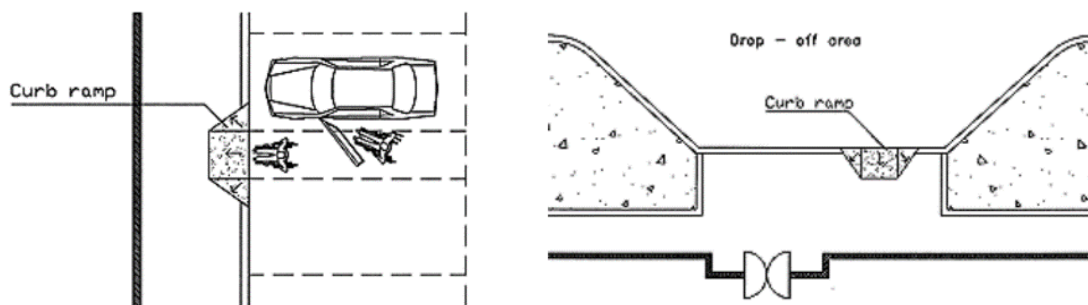
Figure 2-17 Application of Curb Ramps

Source: UNESCW (2004)

Curb ramps at intersections

Curb ramps can be installed at intersections in any of the following methods:

a. Directly across the corner

b. Diagonally across the path of travel

c.   Consistently wrapped around the corner
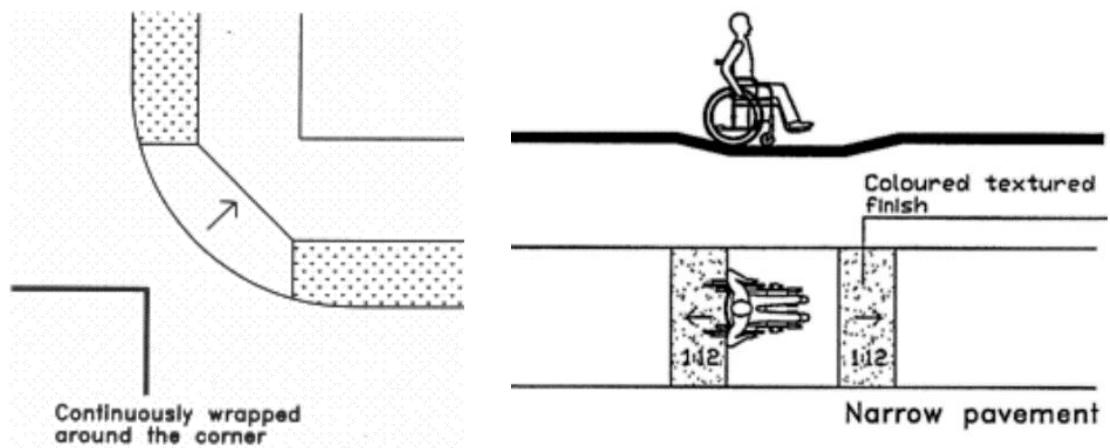
Figure 2-18 Curb Ramps at Intersections
Source: UNESCW (2004)

Narrow pavement

•   The entire pavement should be lowered, with a maximum slope of 1:12, where the construction of curb ramps would affect the width of the travel route, to provide the necessary level transition.

•   The tactile tiling depicting the location of the pedestrian crossing could be built as shown in figure, for narrow pavements that are lowered at a corner.

Width

•   A curb ramp must have a minimum width of 0.90 m, not including the sloping sides. The suggested width is 1.20 meters.
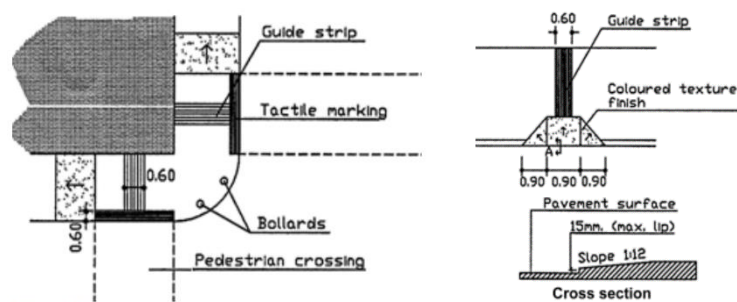
Figure 2-19 Width of Curb Ramp
Source: UNESCW (2004)

Slope

•   A curb ramp should have a maximum slope of 1:12.

•   Flares should have a maximum slope of 1:12.

- The transition from a curb ramp to a pathway's surface should be level. Useful lips range from 15 mm and under.

Guide strips

- To direct blind and partially sighted pedestrians to the curb ramp, a guide strip dressed in a contrasting color should be installed.

Surface and color

- To help blind pedestrians, the hue should be distinctive and contrast with the nearby surfaces.
- To be noticeable and slip-resistant, curb ramps, including flares, must have a coarse texture or ground pattern.

4. Existing Constructions

- A curb ramp built alongside high sidewalks should not have a slope greater than 1:10.
- The flares must have a maximum slope of 1:10 as well.
- Existing curb ramps should be modified if they don't meet the aforementioned specifications.
- The pavement could be lowered to the road level to achieve the necessary shift between the pavement and the road surface for narrow pavements that are more than 0.15 m high in which the construction of curb ramps would obstruct pedestrians' free passage.

2.6.6   Pedestrian Crossings

1. Problem Identification

- The absence of crossing warning signs.
- Road surface gratings.
- An unevenly paved road.
- Absence of guiding strips

2. PLANNING PRINCIPLE

- To make it easier for disabled people to cross the street safely and independently.

3. DESIGN CONSIDERATIONS

<u>General</u>

• For the safety of all road users, it is suggested that traffic islands be built to shorten the distance of the crossing.

• Traffic control signals ought to be installed at pedestrian crossings.

• A pedestrian push-button system can be used to control low-traffic crossings that are frequently used by disabled people.

<u>Guide strips</u>

• For the benefit of those who are blind, a guide strip should lead to pedestrian light poles with push buttons.

• For the benefit of blind pedestrians, guide strips should be built to show the location of pedestrian crossings.
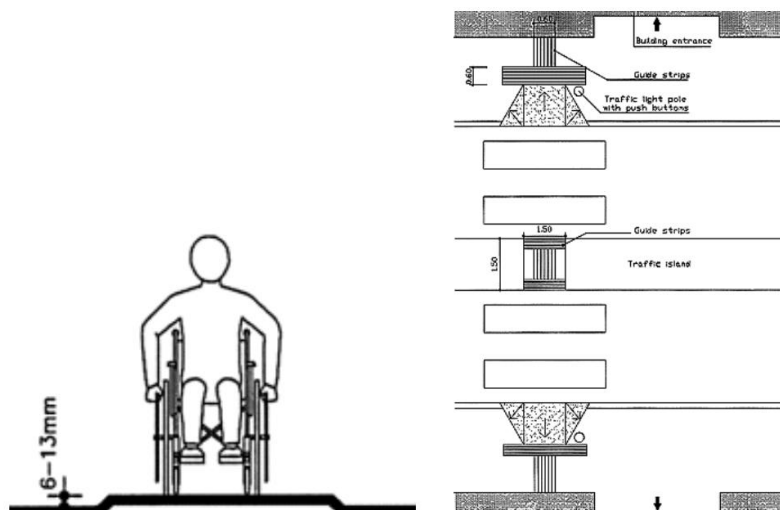
Figure 2-20 Pedestrian Crossings
Source: UNESCW (2004)

<u>Traffic signals</u>

• It is not advised to install two nearby acoustic devices, such as bleepers, in order to prevent disorientation.

• Acoustic devices ought to be mounted on a pole at the starting point of the crossing rather than the ending point.

• The time interval permitted for crossing should be programmed based on the individuals who cross the road slowly.

• For the benefit of blind pedestrians, pedestrian traffic lights should have audible signals that are easily understood.

<u>Push buttons</u>

- For the benefit of wheelchair users, push buttons should be placed between 0.90 m and 1.20 m off the ground and be simple to find and use.

Traffic islands

- To help blind pedestrians find a traffic island, its beginning and end should be marked with a colored tactile marking strip that is at least 0.60 meters wide
- The depth of the traffic island must not be below 1.50 meters.
- A traffic island's width shouldn't be under 1.50 meters.

Road hump

- Wheelchair users won't have to adjust to height differences if the road surface at pedestrian crossings is raised to the same level as the pathway.

Surface

- Firm, well-drained, non-slip, and devoid of construction joints should all characterize the road surface.

2.6.7 Parking

1. Problem Identification

- Inadequate parking facilities
- Insufficient parking aisle width.
- No designated parking space for people with disabilities.

2. Planning Principle

To offer handicapped parking spaces as closest as possible to the final destination.

3. Design Considerations

General

- At least one level of multi-story indoor parking facilities should be served by an accessible elevator.
- Both above- and below-ground parking lots must comply with accessible parking regulations.

Number

- At least 8 accessible parking spaces, plus 1 space for every additional 100 cars over 400, should be available in parking facilities with more than 400 spaces.

- There should be at least 1:50 accessible parking spaces available for parking facilities with a maximum of 400 spaces (one accessible space for every 50 spaces).

- There should be at least one accessible parking space available in every parking facility, even those with fewer than 50 vehicles.

Location

- Vans equipped with lifts for wheelchair users are better suited to the ends of rows.

- Accessible parking spaces for outdoor parking should be placed no more than 50 meters from accessible building entrances. Accessible parking spaces for indoor parking should be placed as close as possible to exits or right beside the accessible elevators.

Dimensions

- An accessible parking space must be at least 3.60 meters wide. The suggested width is 3.90 meters. There is a 1.20 m wide access aisle that can be found between two regular parking spaces.

- Vans with hydraulic lifts require a 2.40 m minimum height clearance for indoor parking. In parking lots with angled spaces, the extra room at the end of a row can serve as an parking aisle for people with disabilities.
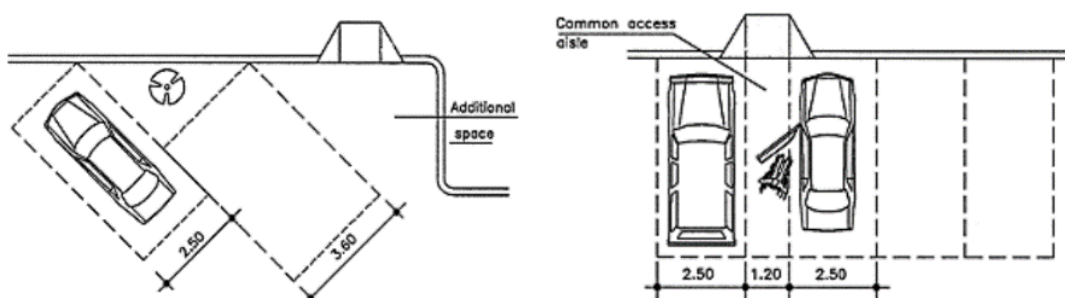
Figure 2-21 Parking Dimensions

Source: UNESW (2004)

Parking curb

- The pathway must be separated from the vehicular area by a textured surface at least 0.60 meters wide if there is no curb; otherwise, bollards should be used. You can also use pre-cast wheelstops to create a passageway that is at least 0.90 meters wide.

• If there is a curb, curb ramps ought to be installed to connect accessible parking spaces with accessible walkways.

Curbside parking

• Unless it is specifically intended as an accessible drop-off area, curbside parking is risky for people with disabilities.
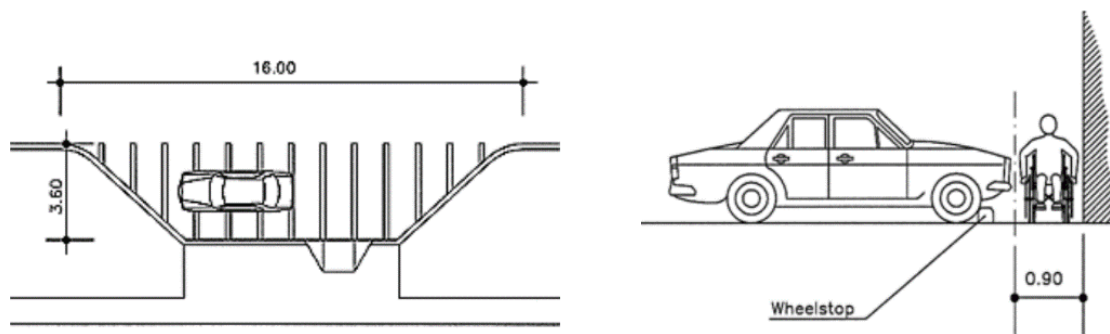
Figure 2-22 Parking Curb

Source: UNESW (2004)

Drop-off areas

• Drop-off zones are useful for picking up and delivering PwDs, parents with young children, people carrying loads, and so on.

• Drop-off zones should be available at bus stops and other public transportation hubs, and they shouldn't be more than 30 meters from accessible building entrances.

• The drop-off zone should have an aisle that is at least 1.20 m wide and at least 3.60 m wide to enable movement.

• The length ought to fit at least two automobiles.

• To improve circulation over paved surfaces, suitable curb ramps should be offered.

• In the absence of a curb to demarcate the area for pedestrians and vehicles, a cue must be installed to direct blind pedestrians

a) Bollards may be used

b) Tactile marking strip at least 0.60 meters wide could be built at the edge of the pathway to signal the change from a pedestrian area to a vehicular area

• At passenger loading zones, a secure shelter or canopy with seating areas is a recommended design element.

• A drop-off zone should be marked with signs to make it clear that it is not to be used as a parking spot.

<u>Surface</u>

- A parking lot should have a uniform, smooth surface.

- A parking ramp's slope shouldn't be greater than 1:10.

<u>Signs</u>

- Parking spaces that are accessible should be identified with the universal acces
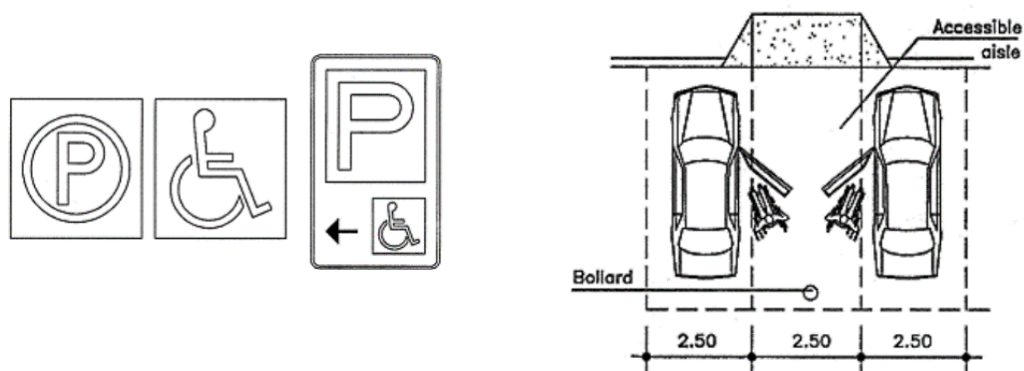
Figure 2-23 Parking

Source: UNESW (2004)

sibility symbol.

4. Existing Constructions

- A vehicular drop-off zone within 30.00 m of the entrance or a parking space close to the entrance should be built if the parking space is more than 50.00 m from the building entrance.

- If there aren't any accessible parking spaces available, one of the following measures should be used:

a. To create one accessible parking space, block a regular stall on the outskirts with bollards.

b. To create two accessible parking spaces, block a regular stall in the middle.

c. Two parking lanes that are accessible

- Alternative outdoor parking spaces for vans carrying PwDs must be provided for indoor parking areas with clear heights less than 2.40 m.

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2.7 Architectural Design Considerations

(UNESCWA, 2004)

2.7.1 Ramps

1. Problem Identification

- Entrances to buildings that are inaccessible because the indoor and outdoor elevations differ.

- Level differences on routes that prevent accessibility.

- The absence of ramps or their faulty design.

- Long, extremely steep ramps without any resting landings.

2. Planning Principle

To install ramps wherever stairs prevent pedestrians, particularly those in wheelchairs and those with mobility issues, from moving freely.

3. Design Considerations

General

- For ramps, an exterior placement is preferred. Ramps inside are not advised since they take up a lot of space.

- Ideally, a ramp's entrance should be situated right next to a set of stairs.

Ramp configuration

- Ramps may be set up in one of the following ways:

(a) Straight run

(b) 90 turn

(c) Switch back or 180 turn

- Ramps that are curved or circular should not be used.
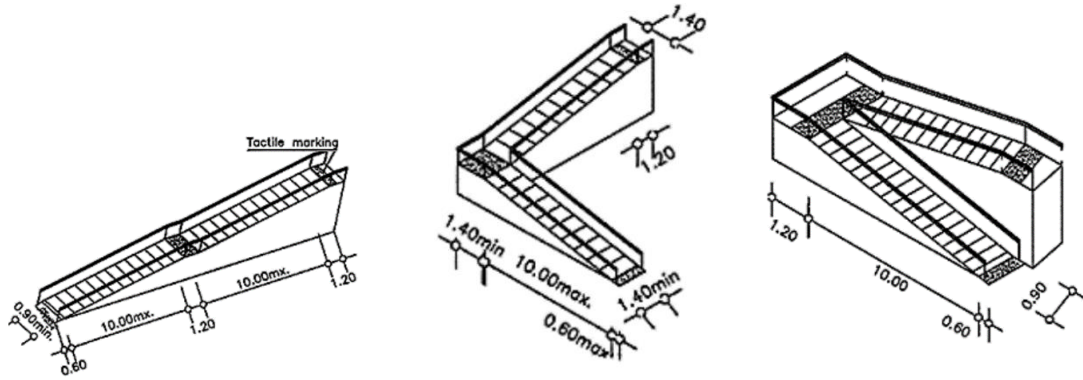
Figure 2-24 Ramp Configuration
Source: UNESW (2004)

Width

- The width varies depending on the use, arrangement, and slope.

- A 0.90m minimum width is required.

Slope

- Ramps should have a maximum recommended slope of 1:20. Depending on the distance to be covered, steeper slopes could be permitted in special circumstances.

Maximum slope	Maximum length	Maximum rise
1:20 i.e., 9%	-	-
1:16 i.e., 6%	8 m	0.50 m
1:14 i.e., 7%	5 m	0.35 m
1:12 i.e., 8%	2 m	0.15 m
1:10 i.e., 10%	1.25 m	0.12 m
1:08 i.e., 12%	0.5 m	0.06 m

Landings

- The landing should be at least 1.20 meters long and have a ramp-like minimum width.

- Landings should be provided every 10 meters, at every direction change, and at the top and bottom of every ramp in order to allow for resting, maneuvering, and avoiding excessive speed.
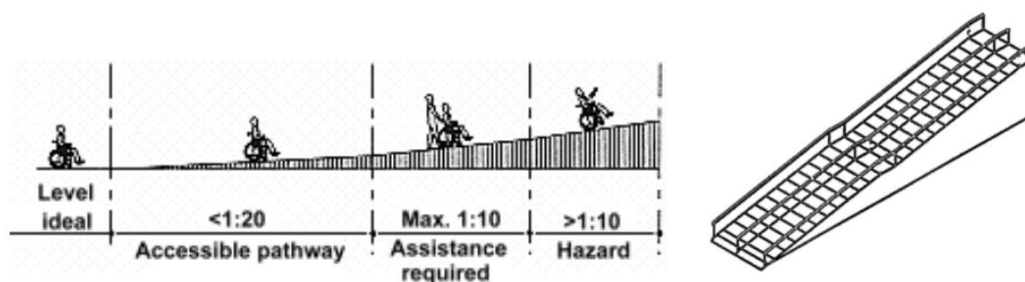
Figure 2-25 Slope of Ramp
Source: UNESCW (2004)

Handrail

- The entire length of ramps must have a protective handrail that is at least 0.40 m high.

- When both sides are being used for gripping, the space between handrails should be between 0.90 m and 1.40 m.

- An intermediate handrail could be installed for ramps wider than 3 m.

Surface

- Rugs should not be used.

- The ramp should have a firm, non-slip surface.

Tactile marking

- The marking strip width should not be less than 0.60 m, and it should be placed at the top and bottom of the ramp to alert people who are blind to its location.

- To prevent the buildup of water, adequate drainage should be offered.

Obstacles

- Ramp clearance requirements are the same as those for pathways.

Mechanical Ramps

- While mechanical ramps are usable in sizable public buildings, people with physical limitations shouldn't use them.

- If a person in a wheelchair is going to use the ramp, the slope shouldn't be greater than 1:12.

- To prevent slipping, the maximum width should be 1 meter.

4.   Existing Constructions

- If the existing building's topography or structure poses limitations, a small variation in gradient is permitted in relation to ramp length.

- Slippery ramps should have a non-slip surface finish.

2.7.2   Elevators

1.   Problem Identification

- Insufficient interior room;

- Control panel, buttons, and switches placed too high.

- Doors at the front.

- Inadequate opening interval.

2.   Planning Principle

To provide accessible elevators with the proper dimensions for people with disabilities.

3. Design Considerations

General

- Key-operated elevators should only be used in private facilities or when an elevator operator is present.

- The accessible elevator should serve all floors typically accessible by the general public.

- Long elevator cabs are undesirable; wide ones are.

Elevator cab

- The internal elevator must be at least 1.00 m by 1.30 m in size to accommodate one wheelchair user alone.

- The door opening must be at least 0.80 meters wide.

- A handrail mounted 0.80 to 0.85 m above the floor should be present on three sides of the elevator's interior.

- A 20 mm tolerance should be the absolute maximum for stop precision.

Figure 2-26 Elevator Cab
Source: UNESCW (2004)

Control panel

- The control panel must be mounted 0.90 m to 1.20 m above the floor for ease of reach. Control buttons ought to be easily reachable and illuminated. They should have a 20 mm maximum diameter.

- The floor selector buttons' numerals ought to be embossed so that they are visible to the touch.

Call buttons

- Call buttons must be mounted 0.90 to 1.20 meters above the ground to be easily accessible.

Floor identifiers

- To make it easier for a blind passenger to determine the floor they have reached, tactile numerals should be positioned at a height of roughly 1.50 m on both sides of the door jambs.
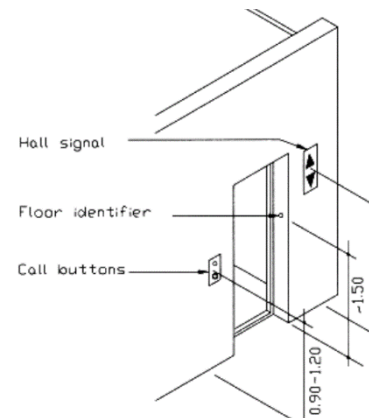
Figure 2-27 Call buttons and floor identifiers
Source: UNESCW (2004)

Hall signal

- The elevator hall signal must be positioned roughly 1.80 meters high.

Door re-opening activators

- At least five seconds should pass between door openings. Reopening activators ought to be available.

Audiovisual signals

- The elevator should simultaneously alert passengers who are blind or deaf to the arrival of each floor with a bell and a light.

<u>Floor surface</u>

- On each floor, there should be a low-pile fixed carpet or a non-skid resilient surface in front of the elevator and on the elevator floor.

<u>Color</u>

- To be clearly recognizable by people with visual impairments, the color of the elevator door must contrast with the surface it is on.

4. Existing Constructions

- A current elevator cab must be at least 0.95 m x 1.25 m in size to accommodate a single wheelchair user. Replace any smaller cabs immediately.

- A door opening for an existing elevator must be 0.75 meters wide to be considered acceptable.

- The maximum reach of a wheelchair user is 1.40 meters from the floor, so call buttons and control panels mounted higher than the advised height may be left in place if they are within this distance.

- It is advisable to replace controls mounted higher than 1.40 m.

- If two control panels are identical, only one needs to be changed.

2.7.3   Stairs

1. Problem Identification

- Spiral staircases
- Steps with poor design that restrict foot movement.

2. Planning Principle

To provide secure, adequately sized staircases for everyone's comfort, particularly those with mobility issues.

3. Design Considerations

<u>General</u>

- To ensure that people with disabilities are as comfortable as possible, level differences should be illuminated or reduced to a minimum.

- Where there are steps in an otherwise accessible path, a complementary ramped route, elevator, or lift should be offered.

- Steep landings and circular staircases ought to be avoided.

- It is not advised to use open risers.

Width

- A stairway should have a minimum width of 1.50 m for two-way traffic and 0.90 m for one-way traffic.

- The riser and tread distances for indoor stairs should be 0.28 m and 0.35 m, respectively.

- The maximum riser and minimum tread sizes for outdoor stairs must be 0.15 m and 0.30 m, respectively.

Landing

- When the stairs cover a level difference of more than 2.50 m, an intermediate landing must be provided.

- The landing must be least 1.20 meters long and extend the full width of the stairs.
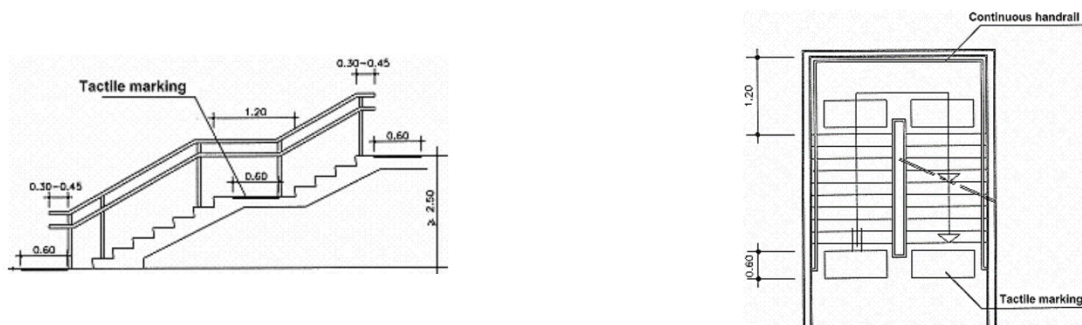
Figure 2-28 Stairwidth, landing and handrail
Source: UNESCW (2004)

Nosing

- Sharp edges and overhanging nosing should not be used for treads.

- Nosing should be flush or rounded and should not project more than 40 mm.

Handrails

- Handrails for grabbing must be installed around the landing and on both sides of the stairs.

- The distance between the handrails when both sides are used for gripping should be between 0.90 m and 1.40 m. One or more intermediate handrails may be provided for stairs wider than 3.00 m.

- At the top and bottom of the stairs, handrails must extend 0.30 to 0.45 meters.

Tactile marking

- To let blind people know where the stairs are, a textural marking strip should be placed at the top and bottom of the stairs as well as at intermediate landings. The tactile marking strip must span the entire width of the stairs and be at least 0.60 meters wide.

- The color of the strip should contrast with the surface it is on to help users with poor vision.
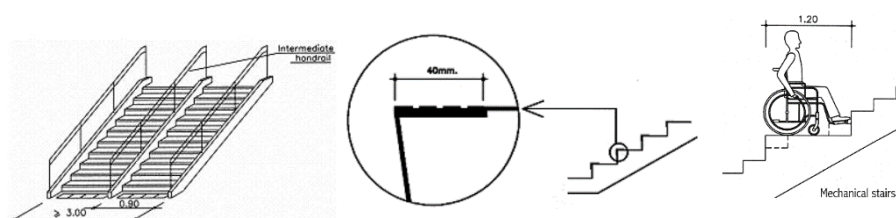
Figure 2-29 Recommended nosing types
Source: UNESCW (2004)

Surface

- Landings, treads, and nosing ought to be non-protruding and slip-resistant.

- To drain surface water, exterior stairs must be pitched forward at a 10 mm per meter.

- Carpets on stairs should be fixed with slip-resistant stair nosing.

Emergency stairs

- Tactile markings should be used to indicate emergency stairs.

Mechanical stairs (escalators)

- If mechanical stairs are going to be used by wheelchair-bound individuals, an adaptable tread at least 1.20 meters long can be provided.

- For the benefit of users with poor vision, escalator edges must be painted in a contrasting color.

4. Existing Constructions

- Slip-resistant strips could be applied to the nosing as an alternative if the configuration of the nosing cannot be changed.

- The width and height of slip-resistant strips should not be greater than 40 mm and 1 mm, respectively, above the tread surface.

- The color of the strips should be different from the color of the stairs to help blind people navigate.

2.7.4 Railings And Handrails

1. Problem Identification

- Dangerous railings.

- Difficult to grasp handrails.

- No handrails or railings.

2. Planning Principle

To install sufficient railing wherever it is required for everyone's safety and comfort, especially for people with mobility issues.

3. Design Considerations

General

- Around dangerous areas, accessible roofs, mezzanines, galleries, stairs, ramps, balconies, and raised platforms greater than 0.40 m high, safety guards or railings should be put in place.

- Railings are required for stairway windows that are less than 1 m from the landing.

- Handrails should be put in place in restrooms and commodes to help the disabled.

- For the safety of children, the distance between the vertical and horizontal railing bars should be small.

- The path of travel shouldn't be obstructed by handrails.

Height

- Handrails must be installed between 0.85 m and 0.95 m above the finishing level to make them easier for elderly and disabled people to use who are ambulant.

- A second handrail could be positioned between 0.70 m and 0.75 m off the ground for the benefit of wheelchair users.

- A third handrail could be positioned at a height of 0.60 m to make it easier for children and short people to use.

- A rail or low curb must be placed between 0.10 m and 0.15 m in height to help the visually impaired navigate the environment with a long cane. Low curbs serve as
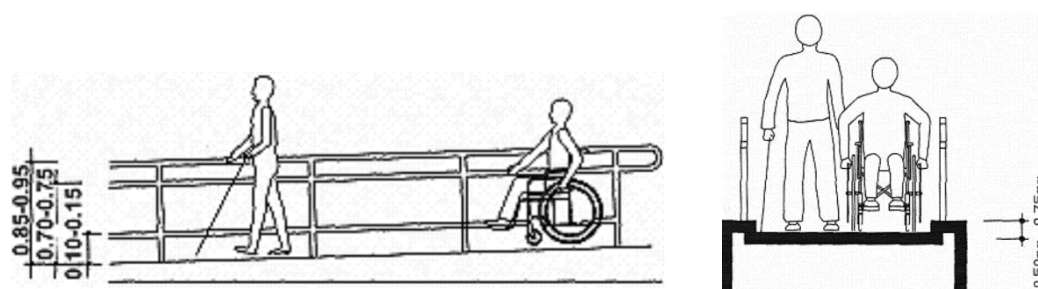
Figure 2-30 Railings and Handrails
Source: UNESCW (2004)

wheelstops as well.

Mounting

- To support heavy loads, railings should be firmly fastened to the wall or another supporting structure.

- In order to avoid endangering blind people, railings should either extend to the floor or merge into the wall.

Form

- Handrails should be easy and firm to grasp.

- 40 mm diameter circular cross sections are preferred.

- Avoid using edges that are too sharp.

Handrails for ramps and stairs

- Handrails should extend horizontally for a distance of 0.30 m to 0.45 m at the top and bottom of stairs and ramps, except for in places where extensions could obstruct pedestrian flow (except for doorways).

- An uninterrupted intermediate handrail may be provided for stairs or ramps wider than 3.00 m.

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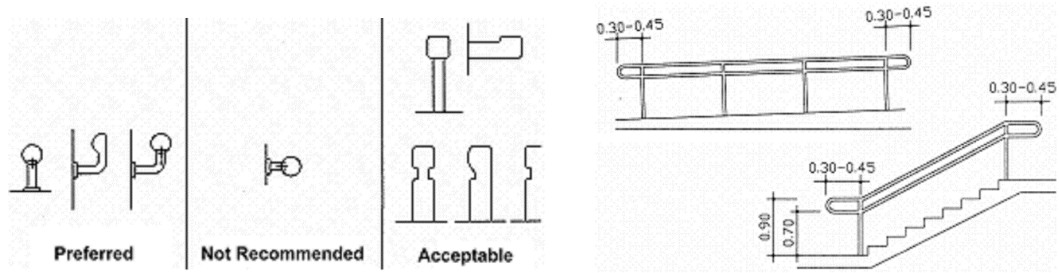
Figure 2-31 Handrail forms
Source: UNESCW (2004)

Wall-mounted handrails

- For smooth walls, the distance between the handrail and the wall should range from 40 mm andto 50 mm, and 60 mm for walls with a rough texture .

- There should be at least 0.15 m between the top of the rail and the top of the recess where handrails are fully recessed into walls.
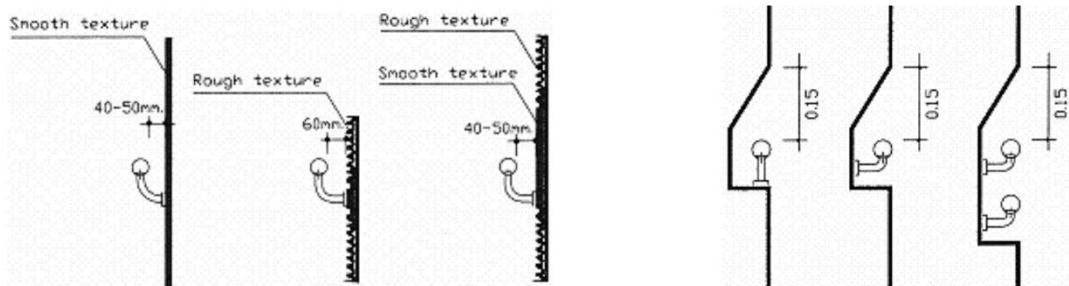
Figure 2-32 Wall-mounted Handrails
Source: UNESCW (2004)

Tactile marking

- To help the partially sighted, emergency exit stairs or ramps should have contrasting tactile strips at least 0.90 meters long implemented to the top and bottom edges of the handrail.

Color

- To caution those with vision issues, handrails should be a contrasting color.

4. Existing Constructions

- Existing handrails and railings should be replaced or modified if they don't meet the aforementioned specifications.

2.7.5   Entrances

1. Problem Identification

- There is no clear accessible entrance.

- There isn't enough room in front of the door.

2. Planning Principle

- To offer easily accessible and noticeable building entrances.

3. Design Considerations

General

- At least one facility entrance should be wheelchair accessible, and all main public entrances for newly constructed accessible buildings should be reachable by an ambulant PwD.

- Every accessible entrance must be linked by accessible paths to accessible outdoor or indoor parking zones, local public transit stops, and drop-off areas in newly constructed structures.

- The accessible entrance in multi-story buildings should provide access to a conveniently situated accessible elevator or lift.

Signs

- Alternative locations for accessible entrances should also be clearly marked with the international symbol for accessibility.

- If the entire building is accessible, no signs are necessary.
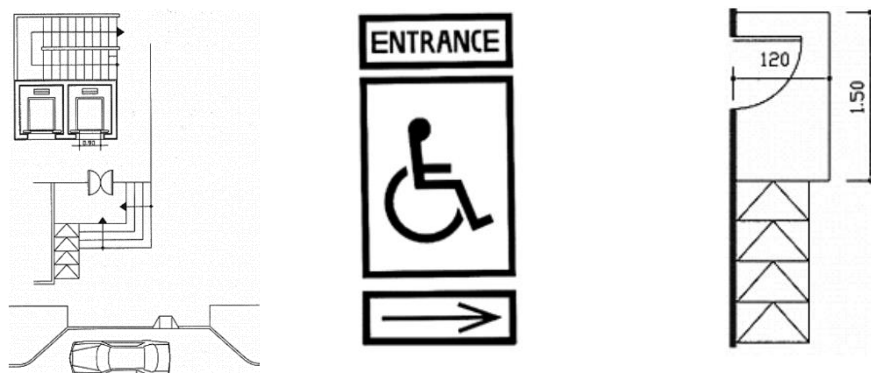
Figure 2-33 Signage at Entrances

Source: UNESCW (2004)

Entrance landing

- The minimum landing proportions must meet the figure where the entry door is opened outward.

- In case, the entry door opens in from the outside, the landing's minimum dimensions must match the figure.

- For drainage, the landing's surface should have a 2% slope.

- The surface finish material ought to be non-slip.

- Doormats made of jute should be avoided. However, when in use, the mat's top surface needs to be flush with the flooring.

- Landings that are protected are preferred.
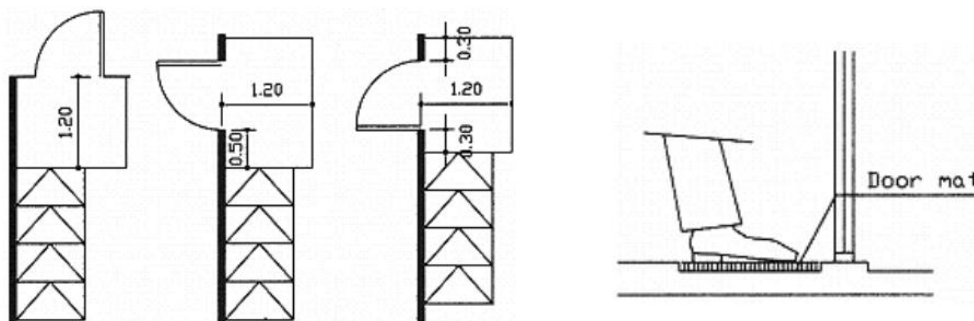
Figure 2-34 Entrance Landing
Source: UNESCW (2004)

Threshold

- Wherever possible, thresholds must be eliminated.

Color

- In order to be distinct, the color must contrast with the surface it faces.

4. Existing Constructions

- A minimum of one accessible entrance should be present in all public buildings. This should, whenever possible, be the main entrance that the general public uses. An alternative accessible entrance should be offered if the main entrance cannot be made accessible for architectural or technical reasons.

a) One of the following options can be modified to make way for an accessible entrance:

b) Use of ramps, bridges, or mechanical lifts;

c) Modification of the entrance level through earthfill, grade, or landscaping changes;

d) Conversion of a window or other ground-level door into an accessible entrance.

2.7.6 Doors

1. Problem Identification

- Narrow entryways.

- Accessibility hampered by doors with incorrect side hinges.

- Thresholds in doorways that are high.

- Heavy, difficult-to-open doors

2. Planning Principle

To make it easier for a wheelchair user to get through doors.

3. Design Considerations

General

- Accessible doors must be made in a way that allows one person to open them with little effort.

- Power-operated doors are ideal for handicapped individuals. The activator system ought to be automatic or put in a convenient location.

- The following elements should be present on an accessible door: signage, door handle, additional pull handle, glazing, and kick plate.

Door types

(a) Automatic doors:

- They come in sliding or swinging varieties. Sliding doors are generally preferred to swinging doors.

- When traffic is heavy, automatic doors come in handy.

- Automatic doors need to open and close at regular intervals.

- Guard rails can be placed close to double-swinging doors to mark the area where the door opens and to shield people from being struck by the door.

(b) Revolving doors:

- People who are disabled or who are pushing strollers should not use revolving doors.

- Accessible swinging or sliding doors should be placed next to rotating doors wherever there are revolving doors.

- Additional gates should be placed next to turnstiles.

(c) Pivoted doors:

- Pivoted doors should, whenever possible, swing away from the path of travel.

- Series of pivoting doors are referred to as vestibules.

(d) Sliding and folding doors:

- Manual folding and sliding doors are advised for small, sparsely populated
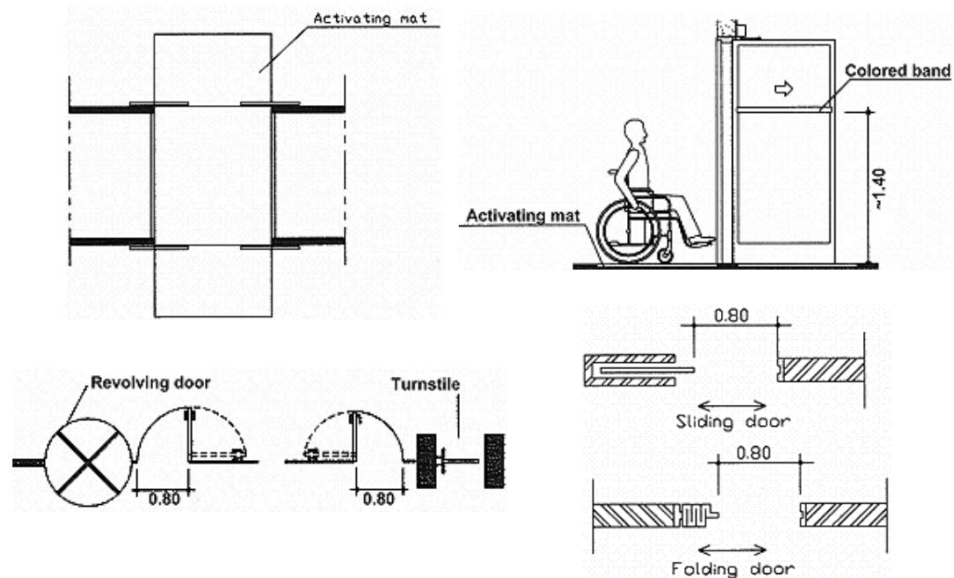
Figure 2-35 Door Types
Source: UNESCW (2004)

areas.

<u>Door opening</u>

- For exterior doors, the minimum opening is 0.90 m when the door is open.

- For interior doors, the minimum opening is 0.80 m when the door is open.

- The minimum door opening can be 0.75 m if the access is straight or if the door can stay open by itself.

- The minimum door width of rest rooms should be 0.75 m.

- For doors installed in an opening more than 0.60 m in depth, the clear door opening should be at least 0.90 m.

- For double-leaf doors, at least one leaf should have a minimum clear width of
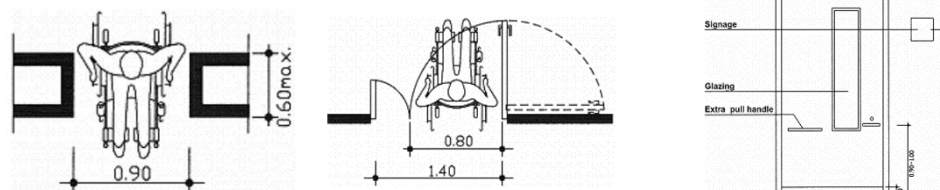
Figure 2-36 Door opening
Source: UNESCW (2004)

0.80 m.

Manual door hardware

All door hardware, including handles, pulls, latches, and locks, should be simple to use with one hand.

(a) Handles: Because they are simple to open, lever-type handles, push plates, or pull handles are suggested for swinging doors.

- It is not advisable to use round knobs.

- Door handles should be placed between 0.90 m to 1.00 m from floor's surface, at a comfortable height.

(b) Locks: Entrance door locks should be mounted between 0.90 m and 1.00 m above the floor, at a comfortable height.

(c) Extra pull handle: A door with spring closers should have an extra pull handle that is about 0.30 m long, mounted between 0.90 m and 1.20 m off the floor and placed between 0.20 m to 0.30 m from the hinged side of the door.

Automatic doors hardware

Methods of activating automatic doors are:

(a) Push buttons at a convenient height of 0.90 to 1.20 meters

(b) Mats that activate and act as a location cue;

(c) Card-insert switch;

(d) Remote control.

Threshold

- When possible, thresholds should be skipped. Instead of thresholds, weatherstripping is preferred at the bottom of the door.

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- The threshold shouldn't be greater than the floor finishing level by more than 20 mm.

- To allow a wheelchair to pass, thresholds greater than 6 mm must be beveled or have sloped edges.

Exit doors landing

- The exit landing shouldn't be more than 20 mm below the finished floor level.

Glazing and glazed doors

- To allow users to see observe oncoming traffic, outward-swinging doors and entryways in public corridors must have low windows.

- In buildings used frequently by people with visual impairments, completely glazed doors should be avoided. The bottom edge of the window cannot be greater than 1.00 m from the floor finishing level.

- Glazed doors should be prominently marked with a colored band or mark that is placed between 1.40 m and 1.60 m in height for the advantage of all users.

Kick plates

- Kick plates are helpful in preserving the door's lower-part finish.

- Kick plates should have a height of 0.30 to 0.40 meters.

Signage

- The room number or it's function should be displayed in public buildings at eye level, anywhere between 1.40 m and 1.60 m, and include international symbols.

- To ensure that the room number is noticeable even while the door is open, room numbers should be mounted on door frames rather than the doors themselves.

Color

- To make it easier for people with impaired vision to identify the door, the frame can be painted in such a color that contrasts with the wall next to it.

4. Existing Constructions

- It is advised that automatic doors take the place of bulky, challenging-to-open swinging doors.

- Doorways that are less than 0.75 meters wide should be made wider. To slightly increase the size of an opening, use a swing-clear hinged door.

2.7.7   Corridors

1. Problem Identification

- Orientation problems caused by long, narrow hallways.

2. Planning Principle

- To provide spacious hallways that will make it easier for wheelchairs to navigate.

3. Design Considerations

<u>General</u>

- Wide hallways are advantageous for wheelchair users, maintenance tools, high-traffic areas, etc.

<u>Width</u>

- A low-traffic passageway should have an unobstructed width of at least 0.90 m. This enables maneuverability in 90-degree turns as well.

- A public corridor must have an unobstructed width of at least 1.50 m. The suggested width is 1.80 meters.

- The minimum circulation space must be as shown in the figure to allow for maneuverability in 180 turns.

- The width of the corridor must permit movement through the doors positioned along it.

Figure 2-37 Width of Corridors
Source: UNESCW (2004)

<u>Obstructions</u>

- Any obstructions that protrude into the corridor, like drinking fountains or public phones, ought to be placed elsewhere, like in alcoves or cul-de-sacs.

- Obstacles and signs that hang over traffic must be hung at least two meters high.

<u>Surface</u>

- Surface level changes greater than 13 mm should be ramped.

- The flooring should be even and non-slip. Rugs need to be firmly fastened.
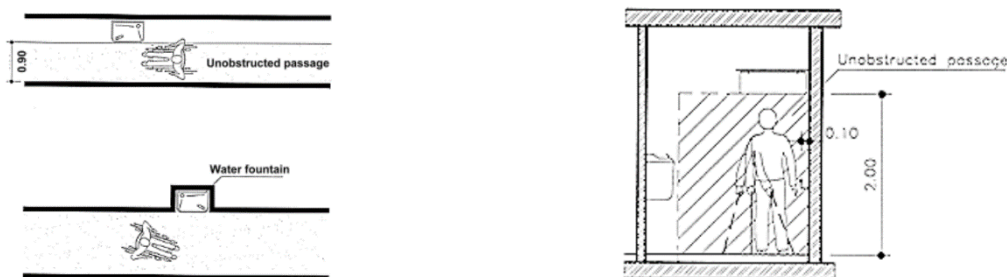
Figure 2-38 Unobstructed Corridors
Source: UNESCW (2004)

4. Existing Constructions

- If possible, narrow corridors must be made wider along their entire length; if not, passing areas must be placed at strategic points along the corridor. The passing area must have a minimum length of 2.40 m and a minimum width of 1.50 m.

- The height of an obstruction or sign can be reduced to 1.95 m in extremely constrained spaces.

2.7.8   Rest Rooms

1. Problem Identification

- Lack of room inside a restroom;

- Poorly designed and placed fixtures and fittings.

- Taps that are challenging to hold.

2. Planning Principle

- Ensuring that restrooms have enough accessible space and that all fittings and fixtures are within easy reach.

3. Design Considerations

General

- The convenience of relocating from a wheelchair to a toilet seat or bidet varies depending on the approach, but turning circles of 1.50 m diameter are advised inside the restroom to enable full-turn maneuver of a wheelchair. There are generally four different methods:

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- The four approaches are as follows:

(a) the frontal approach, which is the most challenging and requires special caution;

(b) the diagonal approach, which is difficult;

(c) the perpendicular approach, that is difficult; and

(d) the parallel approach, that is the easiest.
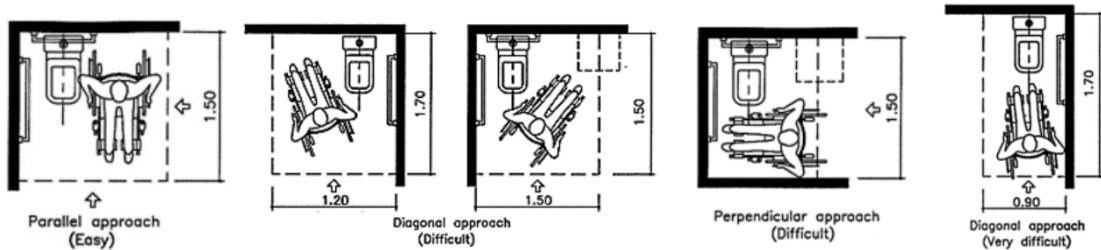
Figure 2-39 Restroom Layout Approaches

Source: UNESCW (2004)

Public rest rooms

- An ambulant PwD should be able able to access at least one cubicle for each gender in any public restroom, and a wheelchair user should be able to access at least one gender neutral compartment in any public restroom. If all restrooms are accessible, it is not necessary to indicate this.

- If there isn't enough room inside the toilet stall, pivoting doors should open outward.

Special public rest rooms

- Even if all restrooms are accessible, it is always preferable to install a designated unisex gender-neutral unit in public buildings so that a disabled person can be helped by a caretaker of the opposite sex.

- Special restrooms should have a water-closet and a toilet, but they shouldn't be the sole accessible restrooms. Special restrooms should be identified with the universal symbol of accessibility.

- Special restroom design and layout should adhere to minimum standards.

Rest room fixtures

1) Water closets:

- The size and layout of water closets and toilet stalls must meet the minimum requirements; and the height of the toilet seat must be between 0.45 m and 0.50 m from the floor's finishing level.
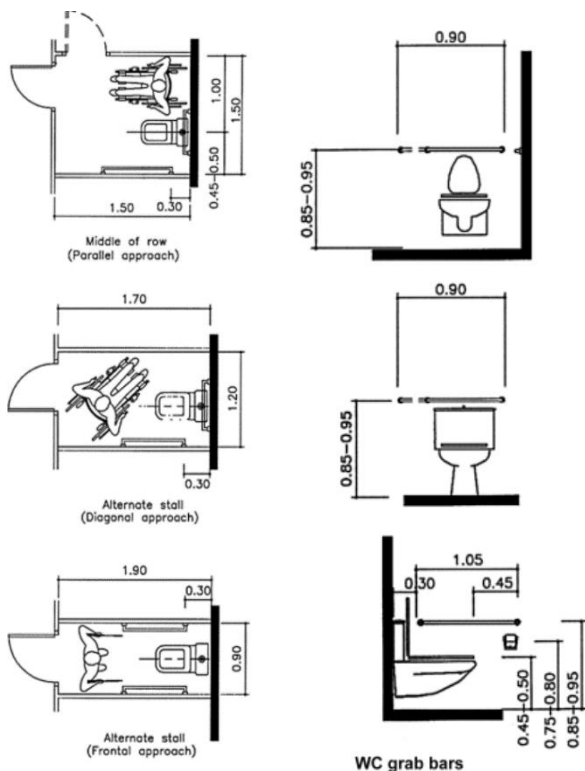
Figure 2-41 Restroom Layout Approaches
Source: UNESCW (2004)

Figure 2-41 Restroom Fixtures
Source: UNESCW (2004)

- If the toilet seat has a grip bar, it should have a space between its center line and the adjoining wall of 0.45 to 0.50 meters.

- If the toilet is tankless, grab bars must be placed on the wall behind it as well as the side wall closest to it. They can also be positioned on the floor at the periphery of the seat.

- Grab bars must be installed between 0.85 and 0.95 meters above the ground.

- Toilet paper and flushing equipment must be positioned within at a height of 0.50 m to 1.20 m.

- It's advised to use flushing controls that can be operated by hand and are on the open side of the WC.

- Water closets that are mounted on walls are advised.

2) Lavatories:

- The size of restrooms should meet the minimum specifications.

- A wash basin's height should be 0.80 to 0.85 meters above finished floor level.

- There should be at least 0.45 meters between the washbasin's center line and the adjoining side wall.

- The washbasin can be pulled away from the wall by 0.15 to 0.20 meters.

- Above the sink, there cannot be any shelves.

3)Bath-tubs:

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- In general bath-tubs are difficult to use by those confined to a wheelchair without the help of an attendant.

- The dimensions of bath-tubs should comply with the minimum requirements.

- The minimum dimensions of the bath-tub should be 1.60 m x 0.70 m.

- The height of the tub should be between 0.45 m and 0.50 m from finished floor level.

- An in-tub seat or a seat at the same height of the tub should be provided at the head side of the tub.

- A grab bar should be mounted on the wall between 0.85 m and 0.95 m from the finished floor level.

- Tubs with a toe recess are recommended.

4) Showers:

- Shower dimensions should meet the minimum specifications.

- The shower must have a seat that is conveniently placed between 0.45 m and 0.50 m above the shower head.

- Rather than being spring-loaded, the shower seat must have a hinged pull-down or detachable design.

- A grab bar should be installed at a height of 0.85 m to 0.95 m on the wall across from the seat and around the back wall.

- Drain openings ought to be put in the stall's corner so that rubber mats that are nonslip can be used there.

Figure 2-42 Bathtubs
Source: UNESCW (2004)

- The shower stall's floor should not be higher than 20 mm below the surrounding floor area's level.

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- The threshold of the shower stall must be beveled and not more than 13 mm above the finishing level.
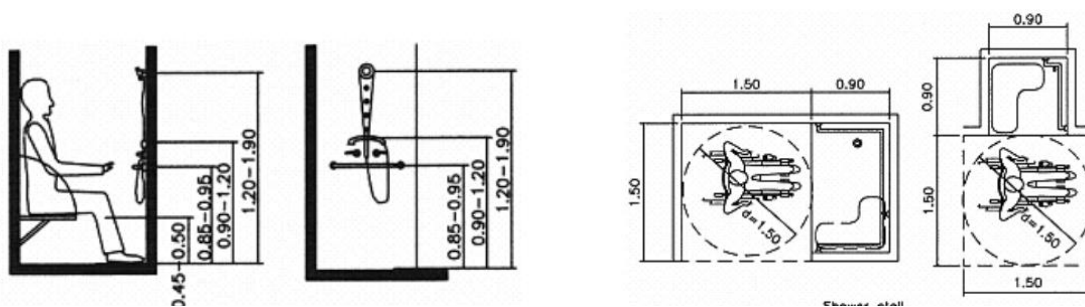
Figure 2-43 Showers
Source: UNESCW (2004)

5) Bidets:

- Bidet dimensions should meet the minimum specifications.

- There must be least 0.45 m between the bidet's center line and the adjacent wall, and the upper edge should range from 0.45 m to 0.50 m above finished floor level.

- Bidets that mount to the wall are advised.

6) Urinals:

- Public restrooms should include at least one accessible urinal, and urinals should have room to spare on both sides.

- The most convenient urinal is one that is fully extended.

- Urinals with protruding lips should be mounted 0.45 m above the floor finishing.
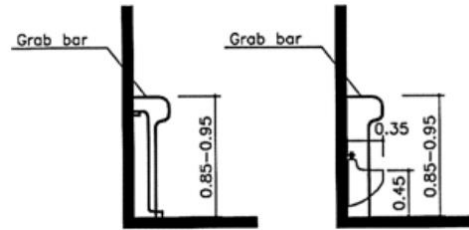
Figure 2-44 Urinals
Source: UNESCW (2004)

Rest room door

- Doors must be lockable from the inside and releasable from the outside in emergency situations.

- The clear door opening must be at least 0.75 m when the door is in the open position.

- No matter the style of door, a handle must be attached to it from the inside in order make closing easier. On the outside, there should be another handle.

Accessories

- Dispensers for soap, towels, and toilet paper should all be situated between 0.50 m and 1.20 m above the finished floor level.

Grab bars

- Grab bars must be installed in showers, bathtubs, and toilets to make it safer and easier for people with disabilities to use the facilities.

- The diameter of grab bars should be between 30 and 40 mm.

- Wall-mounted grab bars must protrude 35 to 45 millimeters from the wall.
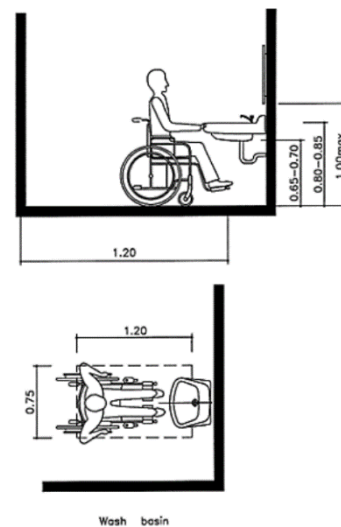
Figure 2-45 Wash Basin
Source: UNESCW (2004)

- Grab bars must have non-slip surfaces and be firmly attached with stand loads; knurled surfaces typically prevent slipping.

Mirrors

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- Mirrors should be usable by both seated and standing people. You can use low mirrors or mirrors that are tilted downward.

- Mirrors' bottom edges should be placed no higher than 1.00 meters above the floor finish.

Faucets

- Single-lever mixing-type faucets that can be operated with the hand or an elbow are advised. Push-button faucets are also practical.

- There must be at least 35 mm of space between the tap's grip and any nearby vertical surface.

- The left tap needs to be attached to the supply of hot water and there shouldn't be less than 0.20 meters between two taps.

- For usage in showers and bathtubs, telephone fixtures with cords at least 1.50 m in length are advised. For the convenience of all users, these can either be hand-held or fixed at a height that can be adjusted between 1.20 m and 1.80 m off the ground.

Flooring

- Doorsteps are not permitted in restrooms. The floor should have the least amount of slope.

- Avoid using thresholds. When necessary, a 20 mm threshold should be used.

- Floor coverings should be slip-resistant and simple to maintain.

- The floor needs to be adequately waterproofed and well-drained.

Alarms

- Alarm systems should be available in restrooms.

Pipes

- Insulation or covering must be applied to all bare hot water pipes.

- Pipes should ideally be installed in the wall.

2.8 Research Case Studies

2.8.1 Accessibility and Utilization of Public Spaces in Famagusta

In this study, the accessibility and use of public spaces are evaluated in relation to how quickly cities are growing and how that has affected the physical and functional makeup of these spaces. This study first assesses the importance of public spaces in urban settings, then identifies the different factors effective in terms of their accessibility and utilization, then gauges the variables affecting accessibility and utilization of public spaces through a survey questionnaire on the function of public spaces in social interaction, and finally evaluates the findings and makes recommendations for further study (Pasaogullari & Doratli, 2004).

Theory	What to measure	Method
Dispersion Dispersed located public spaces is preferable to concentrated located ones	Allocation of public zones and distance between public spaces and households	Preparation of allocation map Questioning the travel time through questionnaire
Proximity Increase in the public spaces' accessibility when people live nearby	Proximity	Determination of whether public space can be seen from the house (through questionnaire)
Ways and means of accessibility Physical structure and type of streets are effective on access	Street type sidewalks	Determination of street type on the way of access
Public transport and car ownership enhance accessibility	Public transport car ownership	Determination of the adequacy of sidewalks and public transport Determination of car ownership rate and effects on access

Figure 2-46 Measuring Accessibility

Source: Pasaogullari & Doratli (2004)

Other Factors Affecting the Use of Public Spaces

Poor accessibility constitutes one of the main obstacles to the use of public spaces, as many urban theorists have noted. The quality of a public space can be defined and affected by other factors after it is made accessible, which in turn increases the number of people who use it. According to various classifications, numerous urban theorists emphasize factors influencing how people use public spaces. Whyte asserts that "there are four key characteristics that characterize a successful public space: they are accessible, people are engaging in activities, the space is comfortable and has a favorable impression, and they are sociable spaces where people meet each other and enhanced social interaction is provided." (Whyte, 2000).

Erkip (1997) categorizes factors influencing the use of public spaces and the satisfaction of their users into the following categories: accessibility, congestion levels, comfort measures, the variety of activities and facilities, quality indicators, security, attractiveness or preservation like an aesthetic consideration (Hatry and Dunn, 1971; Massam, 1975). She also makes the case that user characteristics have an impact on how public spaces are used. Since it is outside the purview of the study, this won't be taken into account in this instance. The emphasis will then shift to aspects like comfort, quality, and aesthetics that are primarily connected to the structural and practical characteristics of the public area itself.

Theory	What to measure	Method
Comfort Comfortable space has a good image and used efficiently	Safety	Determination of safety levels in public spaces and factors affecting safety
Quality Variety of activities and facilities in public spaces are the main building blocks of successful spaces	Variation in activities and facilities	Determination of the types of existing activities or facilities in public spaces (observation and questionnaire)
Aesthetic consideration Physical attractiveness and maintenance is among the most important factors of successful place making	Maintenance and cleanliness Appearance	Determination of the maintenance levels and physical appearance through questionnaire (observation and questionnaire)

Figure 2-47 Measuring Utilization

Source: Pasaogullari & Doratli (2004)

Measuring Access to and Use of Public Spaces in Famagusta

There were 116 people interviewed in total, with 38% men and 62% women. According to the survey, user characteristics like sex, age, education level, or family structure have no bearing on users' preferences for accessibility or how they use public spaces. However, since car ownership is a key factor in determining accessibility in Famagusta, income level is also a related variable.

Table 2-5 User Characteristics

User characteristics		Number of respondents	%
Gender	Female	76	62
	Male	44	38
Age	10–18	–	–
	19–25	26	24
	26–40	64	54
	41–65	26	22
	65+	–	–
House ownership	Rent	17	29
	Household	82	71
Car ownership	Yes	106	91
	No	10	9
Education level	Primary school	4	3
	Secondary school	18	15
	Lycee	32	28
	University	32	28
	Post-graduate	30	26
Family structure	Nucleus	112	97
	Extended	4	3

Source: Pasaogullari & Doratli (2004)

Users of various ages, genders, educational backgrounds, and family structures have provided similar responses to the questionnaire in regards to accessibility or utilization. Famagusta has a low percentage of public transportation, so car ownership (91%) is

high. Users, however, disagreed, stating that an increase in public transportation would create opportunity and enhance accessibility of the public spaces (71%) (Pasaogullari & Doratli, 2004).

Users and non-users were questioned during the accessibility assessment in accordance with the variables : dispersion, proximity, and transport environment. As a result, 69% of users cannot see any public space from their homes, while 50% of the remaining 116 can reach one in more than 15 minutes, demonstrating the disproportionally long distances between many public spaces and residential areas (Pasaogullari & Doratli, 2004).

Users and non-users were questioned about the sidewalks' sufficiency in Famagusta and how they affect accessibility to public spaces because sidewalks and street type have an impact on accessibility. Ninety percent of respondents said the sidewalks currently in place are insufficient, and nearly all (98.5%) said sidewalks have a positive impact on people (Pasaogullari & Doratli, 2004).

97 percent of users said that there aren't enough public spaces and that they aren't distributed fairly when asked about the distribution of public spaces. Figure 1 illustrates this contrast between public spaces in high urban growth areas and those in the traditional core, which are more densely populated. This demonstrates how adverse effects of rapid growth on a city's physical structure (Pasaogullari & Doratli, 2004).

Table 2-6 Assessment of Accessibility

Table 4 Assessment of accessibility

Accessibility		Number of respondents	%
Visibility (can you see a public space from your house?)	Yes	36	31
	No	80	69
Travel time	0–5 min	32	28
	5–10 min	26	22
	More than 15 min	58	50
Streets (physical structure)	Appropriate	32	28
	Inappropriate	84	72
Sidewalks (quality and quantity)	Adequate	12	10
	Inadequate	104	90
Dispersion and proximity	Adequate	4	3
	Inadequate	112	97
Public transport	Effective	82	71
	Not effective	34	29
Car ownership	Effective	106	94
	Not effective	10	6

Source: Pasaogullari & Doratli (2004)

The effect of the predetermined variables —comfort, quality, and aesthetic consideration—was taken into account when assessing utilization. People were questioned regarding whether or not safety affected their use in this regard. Ninety-five percent of respondents said that using any public space safely is crucial. However, there is a physical or other lack of safety in existing public spaces (58.5%). Furthermore, they stated that there is no specific staff member in charge of safety in public areas (95.5%). (Pasaogullari & Doratli, 2004).

People were asked if the availability of different activities in a public space affects utilization when public spaces are evaluated in terms of quality. The majority of respondents (100%) agreed that offering a range of amenities or activities in a public area is essential for use. However, the survey's findings show that there aren't many different activities in

Table 2-7 Assessment of Utilization

Table 5 Assessment of utilization

Utilization		Number of respondents	%
Aesthetic consideration (physical and functional attractiveness)	Effective	106	94
	Not effective	10	6
	Adequate	30	26
	Inadequate	86	74
Aesthetic consideration (maintenance and cleanliness)	Effective	106	94
	Not effective	10	6
	Adequate	32	27.5
	Inadequate	84	72.5
Comfort (safety)	Effective	110	95.5
	Not effective	6	4.5
	Adequate	48	41.5
	Inadequate	68	58.5
Quality (variety of activities or facilities)	Effective	116	100
	Not effective	–	–
	Adequate	28	24.5
	Inadequate	88	75.5

Source: Pasaogullari & Doratli (2004)

the public spaces that already exist (75.5%). In addition, the upkeep and cleanliness of the city's extant public spaces in Famagusta were evaluated, and it was found that these conditions are also deplorable (72.5%). The majority of respondents (94%) agreed that a public space's use is reliant on its upkeep or cleanliness. Since local government employees are the only group specifically tasked with maintaining public spaces, this is hardly adequate. Sixty percent of respondents agreed that using public spaces influences social interaction. However, because they are unhappy with how public spaces are currently maintained, they rarely use them, which results in a lack of social interaction (Pasaogullari & Doratli, 2004).

Lack of upkeep or cleanliness has been recognized as the primary cause of dissatisfaction, followed by a lack of variety in the available activities and an inadequate amount of public spaces. However, access hasn't been mentioned as much, even though the majority of participants own private cars and can drive easily to a remote, well-maintained public space (Pasaogullari & Doratli, 2004).

According to the questionnaire survey's findings, Famagusta's public spaces are inaccessible because of- the absence of sidewalks; locations are not evenly distributed; absence of closeness to residential areas; streets' physical layout not being suitable for pedestrians; Streets serving as important thoroughfares; There are no other options for pedestrians (Pasaogullari & Doratli, 2004). Additionally, public areas in Famagusta are underutilized because of: a lack of safety, a lack of responsible staff, poor lighting, and dangerous equipment; a lack of upkeep and cleanliness; limited options for facilities and activities; inadequate convenience (Pasaogullari & Doratli, 2004).

The survey's results not only show how accessible and used public spaces are, but they also supported the hypotheses that were developed specifically for this study. High percentages of respondents and participation in the survey indicate that respondents with a variety of attributes (age, sex, education level, and family structure) shared many of the same insights. As was stated in Hypothesis II, the functional or physical characteristics of public spaces themselves have a greater impact on usage or accessibility than user characteristics do (Pasaogullari & Doratli, 2004).

Second, the findings indicate that factors like proximity, dispersed location, travel time, and aspects of the transportation environment that were previously determined have a direct impact on accessibility to public spaces. The questionnaire revealed that these factors have an impact on accessibility, and because Famagusta lacks the aforementioned factors, the accessibility of its public spaces is low. Since well-organized public spaces are dispersed throughout Famagusta, access to them requires a vehicle (Pasaogullari & Doratli, 2004).

Third, the questionnaire results support Hypothesis III, which is a claim about how people use public spaces and how factors like comfort, safety, upkeep, cleanliness, and the variety of activities and facilities influence that use. The majority of people concur that these factors have an impact on how people use public spaces. However, because the surveyed area's public spaces lack these qualities, people don't typically use them (Pasaogullari & Doratli, 2004).

2.8.2 Accessibility for People with Disabilities in Urban Spaces: A Case Study of Ankara, Turkey

This article sought to identify the issues that people with disabilities face in urban settings. The main issue was identified as limited accessibility for disabled people to the services provided in urban settings as a result of the architectural barriers caused by the built environment. The accessibility of physical spaces to people with disabilities, their use of those spaces, and their exit from those spaces, as well as accessibility restrictions and issues in urban settings, were covered in detail. In order to ascertain if the accessibility requirements had been implemented in an urban setting, the current state of affairs on the streets of the Kzlay city center in Ankara was observed. People with orthopedic conditions and those who are visually impaired may experience more (Meshur, 2013).

Method

Table 2-8 Evaluation criteria for field survey

CRITERIA	TSE 12576 STANDARD
PAVEMENTS (P)	
P.1. Pavement width	Min. 1.50 m
P.2. Pavement height	Min. 3 cm. Max. : 15 cm.
P.3. Transverse slope	Max. : 2%
P.4. Longitudinal slope	Max. : 5%
P.5. Pavement array	Should be designed in a way that visually handicapped people can easily move and there should be no dangerous chamfer
P.6. Facing joint space for wheelchair	Max: 5 mm
P.7. Paving material	Non-slip material
P.8. Guide track width	60 cm larger spaces than 10 m
P.9. Surface colour of guide track	Contrast of pavement colour
P.10. Surface texture of guide track	Max. height: 20 mm
P.11.Branch hanging down from pavement, thorn, ground clearance of label	Min: 220 cm
P.12.Protective obstacle on the side of curb to prevent car parking on low pavement	Min. height : 70 cm Max. height: 90 cm
P.13. Forestation	Not suitable for pavement narrower than 200 cm
P.14. Thorn and plant with spilled fruits	Not used
P.15. At the bottom of trees on pavement	Road grate or gravel in contrast colour with the environment
P.16.Difference elevation and texture on the ground after plant diameter ending around trees	Width: 60 cm. Height: 10 cm Texture: Sensible surface
P.17. The traffic lane on which electric, lighting, traffic signs, ornamental plants, pedestrian guard rail are placed	(Including curb stone) Min: 75 cm Max: 120 cm
P.18. The distance between drainage grate rods	Max.13 mm
RAMPS (R)	
R.1. With 3 directions slope on pavement sides	Median ramps: 8% – Lateral ramps max 10% One direction sloping ramp max: 8%
R.2. Width	Pavement side ramp min: 120 cm. On the pavement route min: 180 cm
R.3. Pavement sides with vegetation	One direction sloping ramp max: 8%
R.4. Ramps on narrow pavements	Vertical to road max: 2%, Parallel with the road max: 8%
R.5. Join of ramp carriageway	Concavity with raise should not exist
R.6. Sensible Surfaces	In contrast colour with the surface material
PEDESTRIAN ROADS (PR)	
PR.1. Width of bidirectional transition	150 -200 cm
PR.2. Width of guide track	60 cm
PR.3. Colour of guide track for partially visually handicapped people	In contrast colour with environment
PR.4. In accessible roads	Max. slope 5%
PR.5. Resting area between the transition of a ramp longer than 10 m and higher than 50 to the second ramp	250 cm
PR.6. The platform at the beginning and end of ramp longer than 10 m and higher than 50m	150 x 150 cm
PR.7. Drainage grate	Should be in parallel with pedestrian road and road grate spaces: 1.3 mm
PR.8. Level differences of road and its surrounding	Should be between the ranges of 6 – 1.3 cm
PR.9. Ramp surfaces	Solid, stable, non-slip material with little roughness At the beginning and end of ramp 150 cm
PR.10. Protection curb	Min: 5 cm
PR.11. If there is elevation difference more than 20 cm	Bilateral handrail
PR.12. On the ramps wider than 300 cm.	Handrail in the middle
BUILDING ENTRANCES (B)	
B.1.Should be unobstructed starting from the pavement	-
B.2. Entrance platform	Width: 120 cm; Length: 150 cm
B.3. Drainage slope of platforms	2%
B.4.Guidance on the pavements in building entrances	Continuous guidance with guide tracks
B.5.The distance between door and ramp in building entrances	120 cm
B.6. Handrail should exist on sides of ramps	-
B.7. Ramp slope	Max 6% is required
B.8. Paving material	Non-slip material

Source: Meshur (2013)

To assess whether the field areas' physical possibilities matched the criteria, the appropriate groups were formed. The physical component in the field receives 2 points if it meets TSE 12576 standards in regards to both quality and quantity; it receives 1 point if it partially meets the standards; and it receives 0 points if it does not meet the standards. The physical element is denoted with the symbol "*" if it is not present in the required state in the study field (Meshur, 2013).

2: Compliant with the criteria,

1: Comprising only a portion of the requirements,

0: Does not meet the requirements,

*: No established standards exist.

Total point if in compliance with the standards (A-TT), partial compliance with the standards (B-TT), and non-compliance with the standards (C-TT).

Findings and Discussions

Building Entrances

The stairs in the building entrances pose an obstruction especially for people who use wheelchairs.

Guide tracks and continuous routing for visually handicapped people do not exist in most of the building entrances in the area.

The accessibility of people with disabilities to the building entrances is not available. The main problems in the area are building entrances which are closed by commercial uses, the absence of ramp arrangement or ramps which do not conform to the standards.

Figure 2-48 Building entrances in the survey area

Source: Meshur (2013)

The research, which was conducted with 8 criteria in the 60 building entrances examined, determined the highest total appropriateness value that the existing criteria could receive (15 building entrances were evaluated for each street). The highest overall appropriateness score is 240 (15x8x2).

- The total appropriateness value of the streets in the case area: Yüksel: 52, Sakarya: 33, Karanfil: 41, and Konur: 45.

- Suitable for usage by the disabled: 161-240;

- Partially suitable for usage by the disabled: 81-160;

- Unsuitable for usage by the disabled: 0-80.

The study led to the conclusion that the tested building entrances did not meet TS-12576 standards.

Pedestrian Zones

The effectiveness of four major pedestrian routes was examined. Calculations were made to determine the maximum appropriate values that the pedestrian roads' existing

criteria could produce. The study, which was executed with 12 criteria examined for pedestrian roads, determined the highest overall conformity value that the existing criteria could receive.

- The most appropriate overall value is: 12x2=24
- Partially accessible to the disabled: 8-15
- Suitable for use by people with disabilities: 8–15;
- Unsuitable for use by people with disabilities: 0–7.

While Konur (4) was unsuitable for use by the disabled, Yüksel (10), Sakarya (13) and Karanfil (11) were all partially accessible.

It was determined by the evaluation that pedestrian roads did not adhere to TS 12576 standards.

Use of Pavements and Ramps

There were a total of 18 criteria used to evaluate pavements. As per to the extent to which they met the standards, the field criteria were given points, and these points were assessed by writing on the charts. There were 112 pavements in total, it could be said that some of them were partially accessible to people with disabilities.

- Suitable for use by the disabled: 192-288;
- Partially suitable for use by the disabled: 96-191;
- Unsuitable for use by the disabled: 0-95.
- The highest overall appropriateness value is 18x8x2=288.

This assessment indicates that no pavement complies with TS-12576 requirements.

2.8.3 Inferences from case studies

The following are the findings and conclusions which are discussed in relation to the case study arguments:

- In the field of urban design, optimal and comprehensive satiation of human needs under the parameters of architectural and planning concept is regarded as a key design input. The primary goal is the elimination of the issues that affect people with disabilities in urban settings. A goal that calls for the creation of livable environments that are accessible should not only apply to buildings but to every area used for living. To allow disabled people to take advantage of all kinds of environments and to

participate in them, all spaces should reflect all aspects of the user. Additionally, all areas starting from where they live, areas close to where they live, and all areas close to urban areas must all meet these requirements.

- All public spaces in cities should be made usable, not just those for people with disabilities. The conduct of new prototype arrangements to include the elderly and people with disabilities in urban spaces will aid in completely eliminating the problem's root cause. Future issues will undoubtedly arise if people with disabilities are not considered in the design of both indoor and outdoor spaces.

- Being aware of the issue is the main challenge in designing spaces for disabled people. In order for disabled people to be independent, integrated into society, self-sufficient, and socialized, it is necessary for society to accept that these individuals are "incapacitated," but they are "individuals who are capable working efficiently." People with disabilities must be able to independently use all urban spaces without running into any issues in order to allow for this integration into social life.

- The majority of accessibility design principles take into account the needs of individuals who aren't disabled but whose mobility is restricted as they age due to physical limitations. Therefore, these designs benefit a large population of people rather than just those with disabilities, and they address a broader mass of people.

- Local governments have the primary responsibility for ensuring that urban areas are usable by people with disabilities. More financial options should be offered to local government with the intention and ideal of stimulating it to carry out its responsibilities. The creation of an unhindered environment must be covered by legislation. The absence of sanctions is the primary flaw in the current legal system. There isn't a provision or oversight system designed specifically for regional authorities to take decisions necessary in public open spaces. The issue of there being no enforcement or oversight mechanism for this matter must be resolved right away.

- Studies and research on the design of public spaces should be conducted in conjunction with experts from fields like environmental, mechanical, electrical, and construction engineering as well as urban planning, architecture, and landscape architecture. The public and private sectors, local government, related professional chambers, and related ministries should all be involved. Moreover, academic institutions, non-governmental organizations, foundations, charitable organizations, and associations ought to support the works and projects (Meshur, 2013).

- A neighborhood's public spaces should be accessible in no more than 10 minutes of commutation. Also, the areas need to be effectively arranged so that an increased number of visitors are attracted. They need to possess a wide range of amenities in order to draw visitors with a range of personality types. In addition, they need to be secure, well-maintained, clean, and meet people's expectations for comfort. In summary, societies must be able to enhance the well-being of the setting, provide people with practical, cheaper options to exurban growth, give youth leisure options to misconduct, endorse activities for all ages, and offer informative prospects by purposefully incorporating an adequate quantity of essential public zones into the built environment (UOSF, 2002).

- It is common for people to either be born with a disability or develop one later in life. Nevertheless, it is deplorable if public areas are constructed in a manner that prevents those with disabilities from using them. Related research on this subject emphasizes how the designs exacerbate the disabilities of people with disabilities. Making urban areas accessible to people with disabilities aims to enable their social inclusion, freedom of movement outside, integration into community, and most importantly, to boost their confidence. Therefore, the goal remains maintain an equilibrium between one's psychological and physical health, to allow them to participate in community, and to give PwDs the opportunity to live their lives in equal circumstances (Meshur, 2013).

CHAPTER 3.   DATA ANALYSIS AND FINDINGS

3.1   Access Audit: Open Spaces

In order to evaluate the accessibility of the current built-environment as well as the issues people with disabilities face in urban settings, careful findings of accessible provisions have been made in the study area. The following data collection methods were used in a field experiment in the case study area: semi-structured interviews with wheelchair users, both independent and assisted, with and without caregivers, observation through photography, and site analysis with a focus on the accessibility audit of the study area. According to Sawyer and Bright (2004), an access audit's goal is "to assess a particular system's performance in terms of accessibility and usability for a variety of possible users, including PwDs, and also to propose improvements to accessibility provisions." The gaps between the implementation of the urban design guidelines and PWDs' experiences in public spaces will be revealed by an access audit and responses from users on a few chosen points, including accessibility, mobility, activity, and comfort. The purpose of this study is to evaluate Patan's open public spaces' accessibility for people with disabilities and to ascertain the degree of compliance to standards of the design. The UN Design Manual is utilized to assess the implementation of urban design elements in various public spaces. The majority of suggested actions have been evaluated in developed countries, and this manual's target audience includes people with all kinds of disabilities.

There are four groups on its checklist, which are as follows:

a)   Obstructions and signage
b)   Street furniture
c)   Pathways, curbs, ramps and pedestrian crossing
d)   Parking

These four parts were separately assessed under 43 different items (see Table 3-1 for details of assessment criteria). Accessibility was scored on a 5-point scale namely,

• Not Available (-)

• Not Accessible (NA)

•Partially Accessible (PA)

• Accessible (A)

• Fully Accessible (FA) (complete accessibility)

Descriptive scores were utilized to gauge how closely the urban design accessibility checklist was being followed. The author conducted the research between March and April 2022. Each public open space's 43 items were assessed for accessibility by PWD using the standards for the relevant checklist items. The term "partially compliant" was used to describe a product that was in use but not properly designed. Simple percent and points were used in categorical variables to show the degree of conformance to the UN Design Manual. The aggregate percentile and level of conformity for all assesses items were computed for each public space.

Fully accessible- 1 point

Accessible – 0.75 points

Partially Accessible- 0.5 points

Not Accessible – 0 points

Not Available - 0 points

To calculate the percentage of accessibility compliance, the sum of acquired points was divided by the over-all sum of items. In order to better understand the activities and traffic patterns in the public spaces, the sites were observed three times throughout the day: in the morning, in the afternoon, and in the evening.

Notes:
• Not Available (-)
• Not Accessible (NA)
•Partially Accessible (PA)
• Accessible (A)
• Fully Accessible (FA)

Table 3-1 Access Audit: Public Open Spaces

S.N.	Technical guidelines	Accessibility compliance		
		Mangalbazar	Lagankhel	Jawalakhel
1	**Obstructions**			
	Clear unobstructed path - 0.90 m	PA	PA	FA
	Obstructions on the pathway surface	NA	NA	FA
	Overhanging obstructions	FA	FA	FA
	Fixed poles	A	A	FA
	Roadworks	A	-	FA
	Bicycle stands	-	-	-
	Garbage bins	FA	-	-
2	**Signage**			
	International symbol of accessibility	NA	NA	NA
	Direction signs	NA	NA	NA
	Street names	NA	NA	NA
	House numbers	NA	NA	NA
	Maps and information panels	NA	NA	NA
	Shape, Colour, Surface, Lettering	NA	NA	NA
3	**Furniture**			
	Location	A	NA	FA
	Resting facilities	A	NA	FA
4	**Pathways**			
	Guide strips	NA	NA	FA
	Tactile marking	NA	NA	FA
	Curbs (0.07-0.15.)	PA	PA	FA
	Width (0.9m)	FA	PA	FA
	Slope (1:20)	FA	NA	FA
	Surface	NA	NA	A
	Gratings, Manholes, Drainage	NA	NA	PA
	Guards	-	NA	-
5	**Curb Ramps**			
	Width (0.90m)	FA	NA	FA
	Slope (1:12)	-	NA	FA
	Guide strips	-	-	PA
	Surface and colour	PA	NA	PA
6	**Pedestrian Crossings**			
	Guide strips	-	-	NA
	Traffic signals	-	-	-
	Traffic islands	-	PA	FA
	Road hump	-	-	NA
	Surface	-	FA	FA
	Drains and gratings	-	FA	PA
7	**Parking**			
	Number (1:50)	NA	NA	NA
	Location	A	A	A
	Dimensions (3.60 m)	-	-	-
	Drop-off areas (3.6m +1.2m)	NA	NA	NA
	Surface	A	PA	PA
	Signs	-	-	-
8	**Public Toilet**			
	Embossed signs	PA	NA	NA
	Space	FA	NA	NA
	Hight Closet 45-50 cm	FA	NA	NA
	Handrail	FA	NA	NA

3.1.1 Mangalbazar

The Mangalbazar and Durbar Square area of Patan is among the busiest pedestrian regions that connects Langankhel bus park to the Palace complex. Tangal is the pedestrian zone which is between Mangalbazar and Lagankhel. The area is one the most significant junctions in the city. Here, vehicular traffic and pedestrians share the same space as there has been as of yet no arrangement for pedestrians.

Analysis of Assessment

Mangalbazar (the region around Durbar Square) is a top-notch public space that ensures both accessibility and activity. However, the spatial requirement falls short for the minority group of PWD population, particularly for wheelchair users and people who are visually impaired. With reference to the preceding normative requirements of public space—accessibility, activity, and comfort—the particular issue of wheelchair access and the visually impaired has been examined in the context of Patan Durbar Square and its surrounding access roads. The main issues with ensuring the PWDs' presence and involvement in local activities are discussed below.

One of the most important requirements for any space, whether indoors or out, is accessibility. Accessibility to the space as well as accessibility within the space are crucial for ensuring the use of public open spaces. Both of these facts are denied in Patan Durbar Square area to guarantee that PwDs can approach the area. There is a ramp, entrance, and footpath for access to the space. The discussion of observations regarding each actor's performance follows.

Approaching the Infrastructure

There are no curb ramps, tactile blocks, or footpaths on the roads to provide access to the infrastructure.

Figure 3-1 Approaching the infrastructure

Figure 3-2 Unclear separation between footpath and roadways

The only ramp available at the entry of the square in frequently dug up for pipeline or roadwork.

Obstructions

- The surface around the barrier lacks tactile cautionary markers.

- Ragged Surface

- Absence of Signage

- Garbage Bins- in the middle of the pathway

- No contrasting durable color marking strips on fixed poles to warn pedestrians with limited vision

- Lack of warning signs around obstructions.

Figure 3-3 Obstructions in the Pathways

Street Furniture

- Areas for resting must be available at periodic distances between a hundred and two hundred meters.

- The surface of the pathway does not vary texture in a way that would enable blind individuals to locate public services.
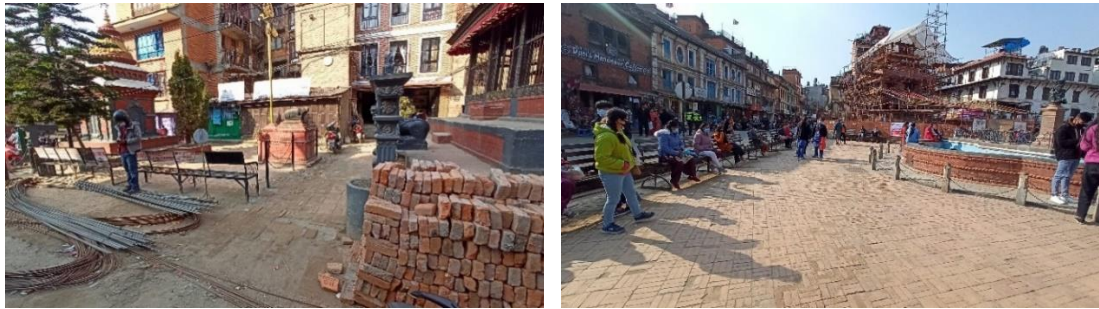
Figure 3-4 Street Furniture

Pathways

- Frequently varying surface level.

- Curbs with potholes and irregular surfaces.

- Disruptions in the pathway that are uncomfortable or hazardous.

- Inadequate width

- Gratings, manholes, drains placed in the middle the pedestrian pathway.

- No guards or barriers available for elevation variations between the path and the adjoining surface above 13mm

- Surface quality: The paving and pathways are mostly of brick soling surface or rubble concrete surface. Sometimes the surface is fragmented, cracked and uneven, which is challenging for the easy and smooth movement of the wheelchair users

- Lack of appropriate and distinguishable paths.

- Roadblocks on the paths preventing entry.

- Rugged and unsteady paths around the infrastructure.

- Inadequate signage.

- Unusable curb ramps.

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Figure 3-5 Inaccessible Steps without Ramps

Ramps / Curb ramps

- Inadequate ramps

- Vehicle parking and other barriers are blocking access to the ramp.

- Ramp slope does not match criteria.

- The majority of locations lack handrails. Existing handrails do not match criteria.

- Ramp width not up to code.

Figure 3-6 Pathways in dire need of maintenance

Parking

- Unmanaged and poor parking facilities.

- Lack of accessible signage.

- No parking spaces designated for PwDs.

- Parking on the streets.

The regional authorities' indifference and the lack of restrictions are likely to blame for this. Additionally, it has to do with significant issues with the applicability, usability, and implementation of pertinent laws in practical contexts.

Signage

- No Braille indicators are present.

- Most places lack and auditory and visual labelling and indicators.

Sanitary Facilities

- Adequate ramps, handrail inside the toilet

- No handrail on the ramp leading to the toilet

- Presence of accessibility signage

- Signage not in braille

Figure 3-7 Accessible Public Toilet

Activity

Observation of the sites were done at three different times of the day including morning, afternoon and evening, to understand the activities and flow of people in the open space. There are varied recreational activities present in the area. However, most of these recreational facilities do not offer any option for the wheelchair users to enjoy them. All the functions are approached by steps which limits active participation of wheelchair users without assistance. No special arrangements of sitting, such as; hand rails, required height and width of seats, and movement are even offered within the functions for the disabled people. Recreational activities like restaurants, roaming around the temples, etc are present, but have no proper accessibility towards it.

Figure 3-8 The Study Area at Different Hours of the Day

Comfort

- **Public utilities:** Public utilities like public toilets are provided in the area. The public toilet has been found to maintain special requirements for the wheelchair users.

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The toilet is convenient for wheelchair users with standard fixture height and handrails within the toilet, no disruptive level change and steep slopes though there was an absence of handrails in its access ramp. However, there were no tactile markings, guides or braille/audio markers to indicate visually impaired people about the presence of an accessible toilet.

- **Urban furniture:** Absence of shades, proper seating facilities and walking pathways creates obstruction in the way of comfort for both assisted and non-assisted wheelchair users. Patan Durbar Square is one of the most vibrant public spaces within the city. But due to the absence of spatial requirement for disabled users, it gives an unwelcoming image to this particular group.

The ramps in the area are not arranged according to the standards. The use of rough pavement and the wrong materials are not appropriate for utilization by PwDs. Only stairs has been preferred in the places where ramps also should be designed with stairs.
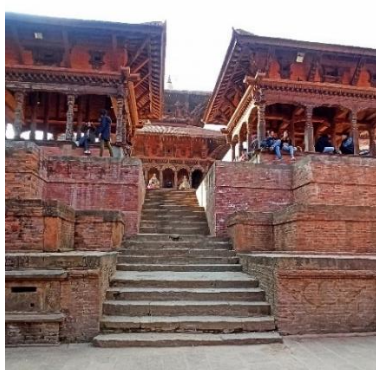
Figure 3-9 Inaccessible drinking water facility

3.1.2 Lagankhel

Lagankhel bus park and its surrounding streets is among one of the busiest vehicular and pedestrian areas in Lalitpur.

1.1.1 Analysis of Assessment

This area is a high-level public realm. The major problems associated with ensuring the PWDs' presence and participation in activities within the area are discussed below.

Accessibility

Approaching the Infrastructure

- No footpaths in certain parts of the access road.

- Absence of tactile marking on the surface of the paths.

- The footpath lacks curb ramps.

Figure 3-10 Lack of maintenance of Pedestrian paths

Obstructions

- Ragged Surface

- Absence of Signage

- Travel path with several obstructions and protruding objects.

- Lack of tactile or visual cautionary indicators surrounding the obstacle.

Figure 3-11 Obstructions in Pathways

Street Furniture

- No access for PWD in the central park.
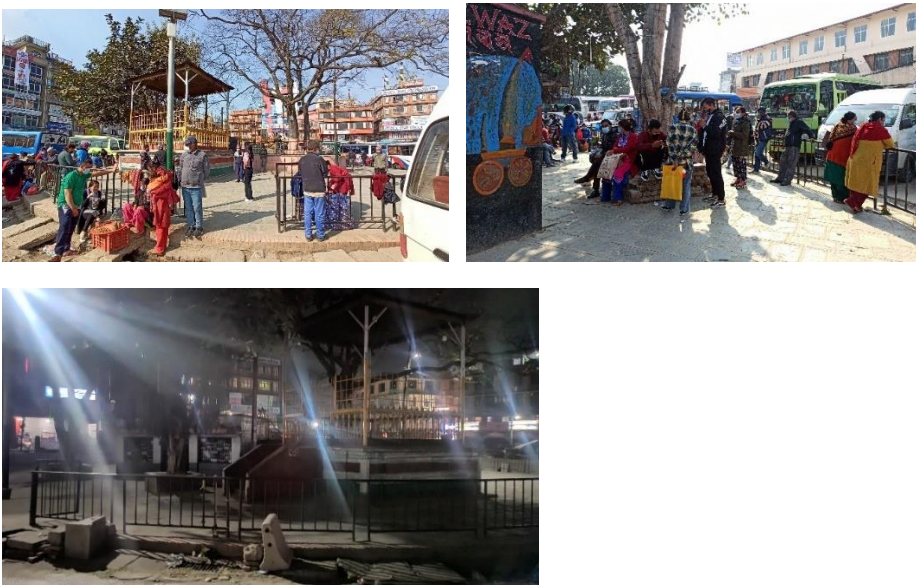
Figure 3-12 Central Park of Lagankhel at different hours of the day

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Pathways

• Frequent changes in elevation of surfaces.

• No guards or barriers available for changes in elevation of above 13 mm between path and the adjoining surfaces.

• Presence of holes and obstructions.

• Troublesome or hazardous disruptions in travel path.

• Gratings, manholes, drains placed in the middle the pedestrian pathway.

• **Surface quality:** The paving and pathways are mostly of brick soling surface or rubble concrete surface. Sometimes the surface is fragmented, cracked and uneven, which is challenging for the easy and smooth movement of the wheelchair users

• No proper signage.

Figure 3-13 No guides on the crosswalk

Figure 3-14 Footpaths encroached by vendors

Ramps / Curb ramps

• Inadequate ramps

- Ramp slope does not match criteria.

- The majority of locations lack handrails.

- Ramp width not up to code.

Figure 3-15 Inaccessible Curb Ramps

Figure 3-16 Inaccessible entrance to public open space

Parking

- Lack of accessible signage.

- Parking on the streets.

- No parking spaces designated for PwDs.

- Unmanaged and poor parking facilities.

Figure 3-17 No designated space for parking

Signage

- Complete absence of any kind of signage.

Sanitary Facilitiy

- The public toilet does not offer accessibility to PWDs

- No signage

- Overcrowded

Figure 3-18 Inaccessible Public Toilet

1.1.2 Activity

There are varied commercial activities present in the area. However, none of these facilities offer any option for PWDs to consume them. All the functions are approached by steps which limits active participation of wheelchair users without assistance. No special arrangements of sitting, such as; hand rails, required height and width of seats, and movement are even offered within the functions for the disabled people. Recreational activities like restaurants, shops, have no proper accessibility towards it. The bus park is extremely unorganized and looking for a bus going o a certain destination is enormously difficult especially for PWDs.

Figure 3-19 Lagankhel Bus Park

1.1.3 Comfort

Public utilities:

- Complete lack of accessibility in the public toilet

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Urban furniture:

- Absence of proper seating facilities

- Central Park is not accessible to people with mobility impairment

- Lack of signage

In Lagankhel, Accessibility issues in public infrastructure and amenities can be encountered in roadways as well as footpaths. Despite being a relatively new development in the city, the area lacks several accessibility features which could have to designed in the beginning or added later on. There is an absence security for PwDs in busy roads. Paving material of the surface of sidewalks is not well-maintained, irregular surfaces make it difficult to be used by PWDs. Open drains act as physical obstructions that are hazardous particularly for wheelchair users and the visually impaired.

3.1.3   Jawalakhel

In the last decade, with its abundance of retail malls, apparel stores, cafes, restaurants, educational institutions, banks, and other contemporary facilities, Jawalakhel has become one of the most popular areas in the Lalitpur district.

Analysis of Assessment

The open space at Jawalakhel ensures both accessibility and activities. The existing scenario associated with ensuring the PWDs' presence and participation in activities within the area are discussed below.

Accessibility

Approaching the Infrastructure

- Edges of the sidewalks have curb ramps.

- Access to the infrastructure through sidewalks.

- Bright tactile tiles on the sidewalks.

- No tactile guide in crosswalk

Figure 3-20 Jawalakhel Park at different hours of the day
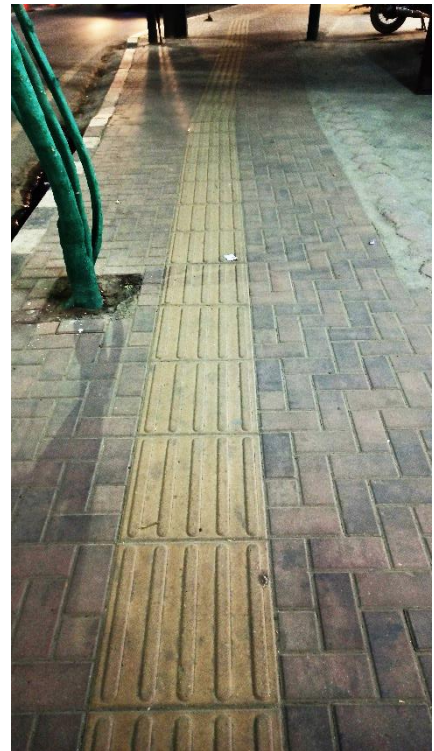
Figure 3-21 Tactile Paving

Obstructions

- Damage on the surface of footpath in a few places

- Curb Ramps not designed adequately

Figure 3-22 Street Furniture

Street Furniture

- Adequate

- Space for wheelchair

Figure 3-23 Seating Area

Figure 3-24 Inaccessible Platform
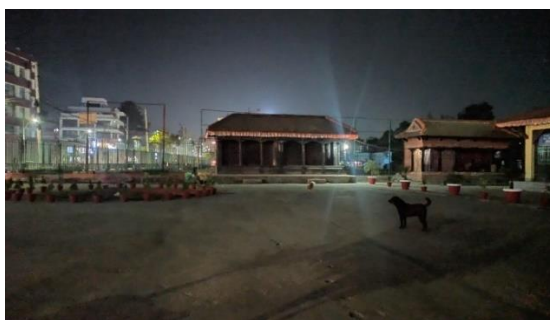
Figure 3-25 Jawalakhel in the evening

Pathways

- Sufficient width.

- Abrupt changes in level with improper curb ramps in a few places.

- Gratings, manholes, drains placed in the middle the pedestrian pathway.

- No guards or barriers available for changes in level of more than 13 mm between the pathway and the surrounding surface

- Surface quality**:** The paving and pathways are mostly of tile surface. In some places, the surface is fragmented, cracked and uneven, which is challenging for the easy and smooth movement of the wheelchair users.

- Absence traffic signal at the crosswalk.

- Curb ramps path not fully usable.

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- Appropriately demarcated pathways.

- Tactile tiles not continuous through the pathways

- No tactile markings inside the public open spaces

Ramp and Curb ramp

- Curb ramps available are not well designed

Parking

- Well-defined parking facilities.

- Lack of accessible signage.

- No parking spaces designated for PwDs.

Signage

- No Braille indicators are present.

- Most places lack and auditory and visual labelling and indicators.

Sanitary Facility

- No provision of public toilets.

1.1.4 Activity

Observation of the sites were done at three different times of the day including morning, afternoon and evening, to understand the activities and flow of people in the open space. Arrangements for seating are available in the spaces.

1.1.5 Comfort

- **Public utilities:** Public utilities like public toilets and drinking water are not provided in the area.

- **Urban furniture:**
  o Absence of shades
  o Proper seating facilities

Observation Results

The access audit demonstrates the compliance of various public infrastructures with the accessibility guidelines provided by the UN Design Manual. The study's findings suggest that the three open spaces are not sufficiently accessible to individuals with disabilities because none of them achieved hundred percent compliance with the standard specifications. Jawalakhel, with a cumulative accessibility percent of 46.5%, is the most compliant. But overall, the study revealed that the studied open spaces aren't sufficiently accessible (Over-all conformity: Mangalbazar 33.72%, Lagankhel 16.27% and Jawalakhel 46.5%; Table 3-2).

Formula for Calculation of Compliance score=

$$\frac{\substack{(\text{Not available x 0}) + (\text{Not Accessible x 0}) + (\text{Partially Accessible x 0.5}) + \\ (\text{Accessible x 0.75}) + (\text{Fully Accessible x 1})}}{\textit{Total number of items}} \times 100 \%$$

Table 3-2 Compliance Score Chart: Open Spaces

	0	NA (0)	PA (0.5)	A (0.75)	FA (1)	Compliance Score
Mangalbazar	12	13	4	6	8	33.72
Lagankhel	9	24	5	2	3	16.28
Jawalakhel	6	14	5	2	16	46.51

Jawalakhel had the best accessibility compliance rate. Indeed, Jawalakhel is a relatively new space, and was designed with accessibility in consideration. The lowest compliances were found at Lagankhel and Mangalbazar. The majority of the components in these two areas open sapces are inadequately constructed, including poor paving, inappropriate curbs, etc. It is clear that in these locations, planners and architects do not consider disabled persons' needs. Several of the items on the open spaces and their surroundings are randomly arranged or have poor design. Examples include difficult-to-use restrooms, undefined bus stations, and irregular surface paving.

3.2 Questionnaire Survey: Open Spaces

The survey is categorized into four segments. In the first segment, inquiries were made in order to identify user profiles; in the second, inquiries were made regarding public space accessibility; and in the third, inquiries were made regarding the use of the surveyed spaces. Finally, the respondents were questioned about any challenges they encountered while visiting the study area and whether they had any suggestions for how to make it more PwD-friendly.

In total, 47 questions were asked to the respondents. The first 14 questions were asked to ascertain the respondents' profile. The subsequent 8 questions assessed the accessibility, and to examine the utilization, and finally reasons for dissatisfaction were asked. The same questions were asked for Mangalbazar, Lagankhel and Jawalakhel. Age, gender, wealth, education, and family structure were all factors considered while creating user profiles. In order to assess accessibility, factors such as distance, trip duration, sidewalk quality, street layout, use of public transportation, and automobile ownership were considered. Lastly, the use of public places was examined in relation to the established criteria, such as their appearance, sanitation, repair, security, as well as the diversity of activities available for PwDs. The questionnaire form used has been provided in the annex.

Results

User Characteristics

The questionnaire survey has been carried out with a total of 20 respondents which has been categorized into two groups including 10 visually impaired persons and 10 people with mobility impairments. All the respondents are residents of Lalitpur and are well acquainted with the Patan area and the majority of them travel to the site area for work every day. Altogether 20 persons, including 9 men and 11 women, were interrogated. According to the survey, individual characteristics like gender, age, education level, or household composition have little bearing on respondents' preferences for accessibility or how they use public places. In regards to accessibility or utilization, respondents of varying ages, genders, educational levels, or family structures provided similar answers to the questionnaire. The respondents were questions about their type of impairment, reason of the condition, house ownership, mode of transportation, vehicle ownership, occupation, annual income, etc to understand their background and lifestyle. Most of the participants were older than 40 years of age, educated and involved in social work.

Age & Gender

Value	Frequency	Percentage
40-49	9	45
30-39	6	30
50-59	3	15
Above 60	1	5
20-29	1	5

Value	Frequency	Percentage
Female	11	55
Male	9	45

Marital Status

Value	Frequency	Percentage
Single	10	50
Married	10	50

Location

Value	Frequency	Percentage
Satdobato, Lalitpur	3	15
Kupondole, Lalitpur	2	10
Gabahal, Lalitpur	2	10
Imadol, Lalitpur	2	10
Kanibahal-6, Lalitpur	1	5
Pulchowk, Lalitpur	1	5
Harisiddhi, lalitpur	1	5
Sundhara, Patan	1	5
Lubhu, Lalitpur	1	5
Godawari- 14, Thaiba	1	5
Kumaripati, Lalitpur	1	5
Bhaisepati, Lalitpur	1	5
Harisiddhi, Lalitpur	1	5
Hattiban, Lalitpur	1	5
Dhapakhel, Lalitpur	1	5

Type of Impairment

Value	Frequency	Percentage
Visual impairment	6	30
Person using 2 crutches	4	20
Persons with low vision	4	20
Difficulty in walking	3	15
Wheelchair user	3	15
Cane user	1	5
Persons using one crutch	1	5

House Ownership & Mode of Transportation

Value	Frequency	Percentage
Household	14	70
Rent	6	30

Value	Frequency	Percentage
Public Transportation	15	75
Scooter	4	20
None	1	5

Education level & Family Structure

Value	Frequency	Percentage
Secondary school	9	45
University	7	35
Post-graduate	4	20

Value	Frequency	Percentage
Living Alone	7	35
Extended	6	30
Nucleus	6	30
Others	1	5

Occupation & Annual Income

Value	Frequency	Percentage
Social Work	11	55
Government Job	7	35
Private Job	7	35
Business	6	30
Others	1	5

Value	Frequency	Percentage
Below 4 lakhs	13	65
4-6 lakhs	4	20

Reason of condition

Value	Frequency	Percentage
more than 30 years ago	9	45
20- 30 years ago	4	20
5-10 years ago	3	15
10 - 20 years ago	2	10
1- 5 years ago	2	10

Value	Frequency	Percentage
Disease	11	55
Accident	6	30
Hereditary	4	20
From birth	3	15

3.2.1 Mangalbazar

Assessment of Accessibility
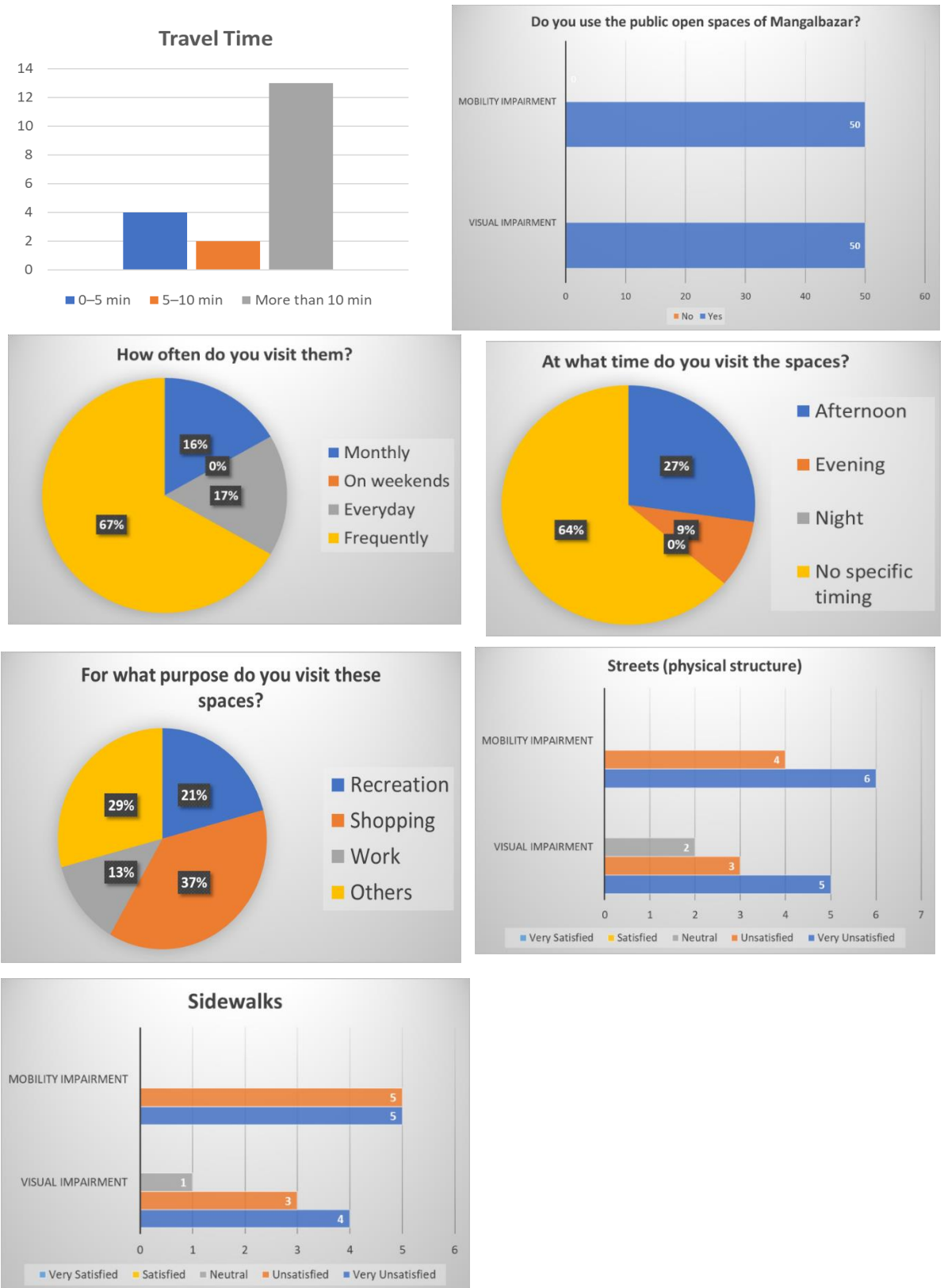
Figure 3-26 Assessment of Accessibility for Mangalbazar

Assessment of Utilization
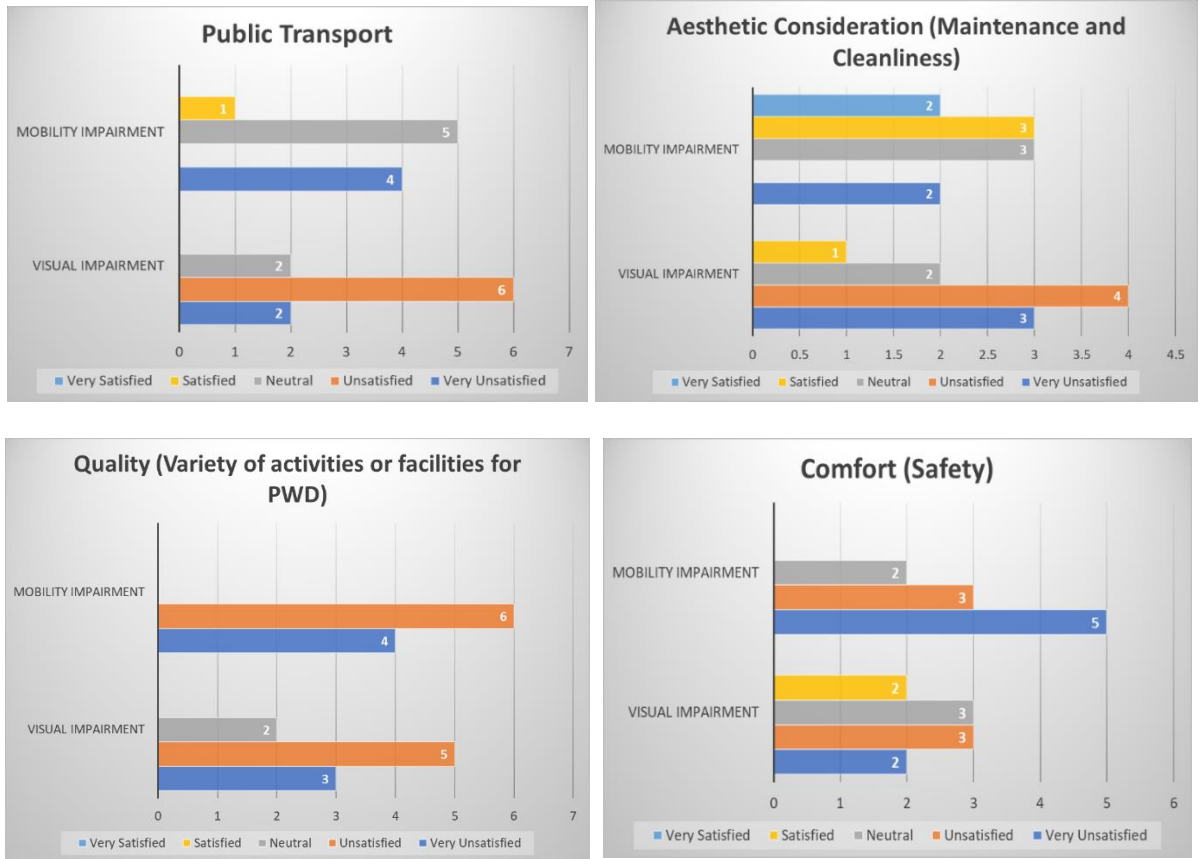
Figure 3-27 Assessment of Utilization for Mangalbazar

Firstly, In the assessment of accessibility of Mangalbazar, the respondents were asked questions regarding the travel time, and use of the open space, where all users responded positively. The majority of them used the space frequently for recreation, shopping and commutation. The respondents were categorized into two groups, namely, people with mobility impairments and people with visual impairment. In terms of accessibility of streets and sidewalks. Both groups responded that they were unsatisfied or very unsatisfied with the infrastructure. Regarding maintenance and cleanliness in the area, both groups gave varied answers. When assessed in terms of comfort and safety, the majority have responded that they were very unsatisfied. 60% of respondents have said that they are unsatisfied with the variety of activities or facilities available for PWDs in the area.

Obstacles faced by people with mobility impairments.

There aren't any seating spaces around the temples that are accessible enough for PWDs. The platforms are too high and there is no provision of ramps in the area. Installing mobile ramps during special occasions aren't sufficient to make the space accessible for PWDs. The temples, palaces and museums are not accessible for people with mobility impairments. The access roads are too narrow and vehicle traffic as well as crowds makes the area difficult to access and navigate. The road has numerous ditches due to lack of maintenance and frequent road or pipeline construction jobs. There is no proper segregation for pedestrians, vehicles and vendor spaces. the height difference of road level of shops makes it difficult for PWDs to shop in the area. All these obstacles make it almost impossible to navigate the area without assistance. Tempos which are the primary means of public transportation in this area, are inaccessible to people to mobility impairments. Lack of curb ramps and preference of steps over slopes and ramps restricts unassisted mobility of wheelchair and crutch users.

Obstacles faced by people with visual impairments

The pathways leading to the square and the square itself lacks any sort of tactile paving to guide PWDs. Lack of segregation of vehicular traffic and pedestrian flow makes it difficult to navigate the area without assistance. The temple and palace complex lacks signage or information in braille to assist visually impaired persons. Lack of awareness in the general public further complicates the experience. According to the respondents, overcrowding of the area major barrier that restricts unassisted mobility of users.

Suggestions from respondents

Government policies should be enforced and implemented correctly. The administration must act quickly to solve the situation and issues at hand while concentrating on improving all other aspects of the accepted accessibility guidelines' enforcement.

3.2.2 Lagankhel

Assessment of Accessibility
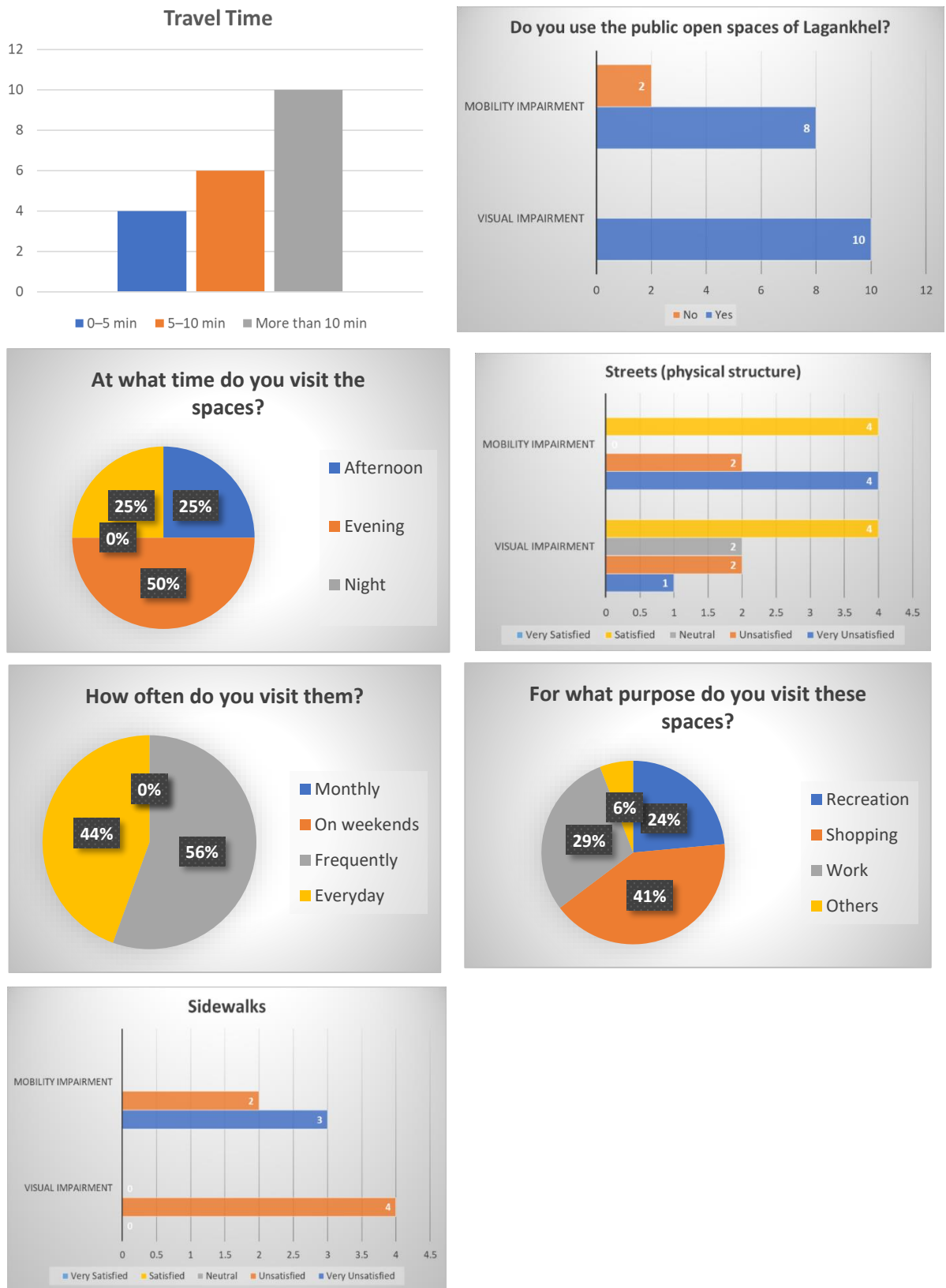
Figure 3-28 Assessment of Accessibility for Lagankhel

Assessment of Utilization
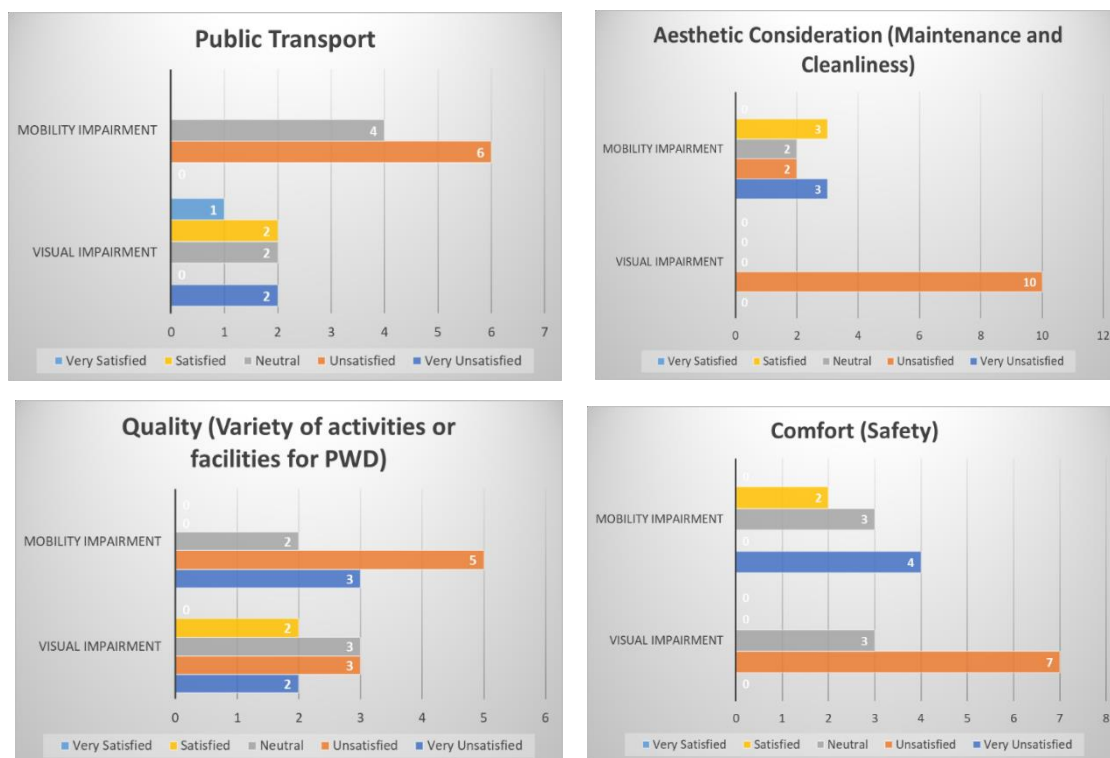
Figure 3-29 Assessment of Utilization for Lagankhel

The same questions as previous were asked regarding the assessment of accessibility in Lagankhel. The majority of them used the space frequently for recreation, shopping and commutation. 40% of users were satisfied with the accessibility of the street whereas, 20% were very satisfied. However, the majority of them replied that they were unsatisfied with the physical structure of the sidewalks. Regarding the public transport, maintenance and cleanliness in the Lagankhel area, they were predominantly unsatisfied with the services. When assessed in terms of comfort and safety, the majority of visually impaired users were unsatisfied with the infrastructure, whereas most of the mobility impaired users were dissatisfied with the variety of activities and facilities available in the area.

Obstacles faced by PWDs

Pavement height is too high. Lagankhel is area is relatively new but still unmanaged. The bus stop area is too unmanaged. It lacks signage and segregation of buses. There is no provision of handrails or street furniture accessible to PWDs. Lack of traffic lights at the crosswalk is a drawback.

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Suggestions from respondents

Crosswalks should be available at proper positions. The importance of proper segregation of road, sidewalk and bus stop was one of the most frequent point brought up by the respondents.

Findings from users' responses and interviews

Due to improper measurement of level changes, users' limited mobility within the park is evident. During an empirical study, their absence was noticed in the majority of the park's social gathering spots. Users of wheelchairs struggle to maintain control of the wheelchair on irregular walkways. Pavement with holes and rough materials makes it harder for people to move around and push chairs. To get the right turning radius for the chair, they have to push through some areas with narrow walkways. This adds unnecessary distance to their journey. Because of the poor design and detailing of spaces, which as previously mentioned can occasionally be a problem for them, public amenities like toilets and drinking water are always out of their reach. Wheelchair users have, however, brought attention to another significant issue from their experiences regarding the attitude of society towards them in addition to the physical barriers of the area. Without assistance, it is very difficult to locate a bus that is going somewhere specific in the bus park because there is no signage at all.

However, because of their dissatisfaction with how public spaces are currently maintained, they rarely use them, which prevents social interaction. Lack of upkeep or cleanliness has been cited as the main cause of dissatisfaction preceded by absence of diversity in the available facilities and activities, and an inadequate number of public spaces.

Disabled people occasionally view the lack of accessible design in public spaces as a natural circumstance and unavoidable condition. The position of disabled people as minority users always becomes the main justification for disregarding their needs and participation

3.2.3 Jawalakhel

Assessment of Accessibility
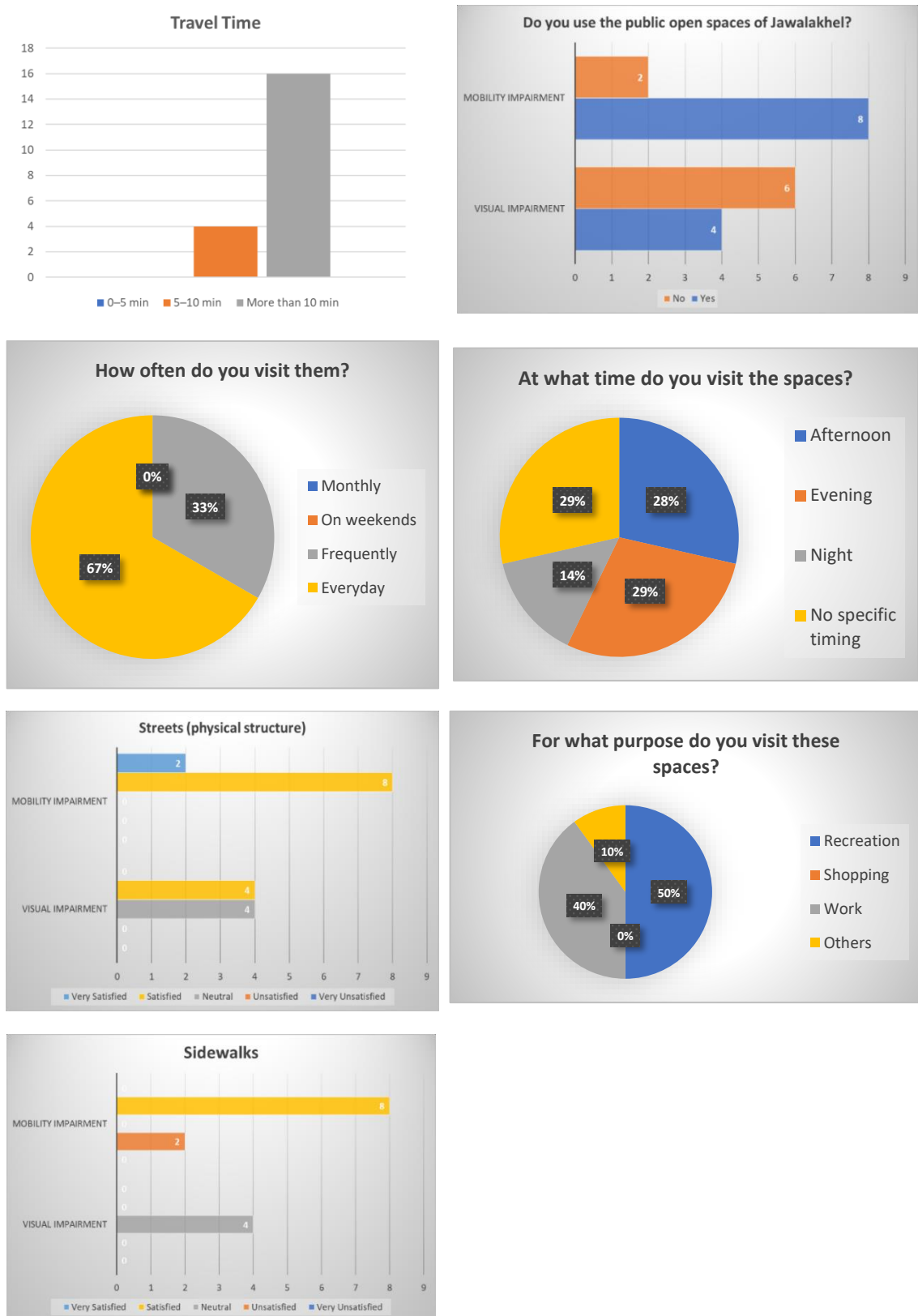
Figure 3-30 Assessment of Accessibility for Jawalakhel

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Assessment of Utilization
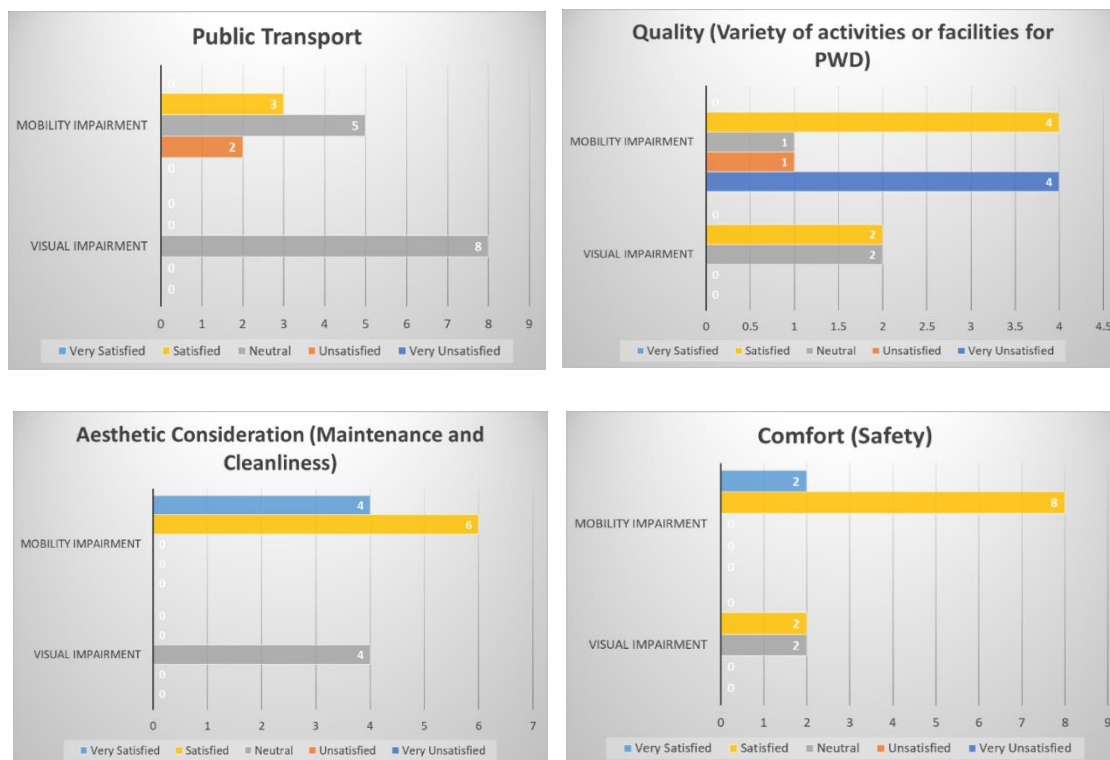
Figure 3-31 Assessment of Utilization for Jawalakhel

Again, the same pattern of questions was asked for Jawalakhel area as well. The majority of them used the space every day for recreation. 50% of users were satisfied with the streets in Jawalakhel whereas 40% were satisfied with the sidewalks in the area. When assessed in terms of maintenance and cleanliness, the users were predominantly satisfied. In terms of comfort and safety the majority of them were satisfied. However, most of the mobility impaired users were unsatisfied with the variety of activities available at the site.

Obstacles faced by PWDs

There are no ramps to access the platform. The pavement height is too high. The 'Sahuliyat Pasal' is inaccessible to PWDs. Jawalakhel has no distinct bus stop and people have trouble crossing the road to catch the bus. Respondents have expressed their dissatisfaction with the behavior of people towards PWDs. They also claimed that people in the city still lack awareness and understanding of PWD rights.

Suggestions from respondents

Government policies should be enforced and implemented correctly. Respondents also commented that a few accessible features in a certain area doesn't make the entire space accessible. To ensure the utilization of public open spaces, both accessibility to the space and accessibility within the space are essential. Therefore, consideration must be given to this concept.

General Comments

The criteria have been developed, but according to the respondents, they are not being adequately used in daily life. The application of the regulations is required at all planning and development work stages by the relevant individuals and administrative agencies. The construction of public buildings requires the adoption of specifications and universal design guidelines, which require training for all contributors, especially governmental authorities, architects, and builders.

To establish inclusive public transportation infrastructure and communication facilities, among many other things, the administration must collaborate as well as engage with regional authorities, public transportation providers, communities, as well as other key parties. Social groups have spoken out against a variety of obstacles that have prevented PwDs from participating equally in society. Additionally, they have advocated accessibility concerns from a rights-based perspective and increased attention towards accessibility and disability problems across the nation. In recognition of their work, the government must make handicap and accessibility concerns a top priority for the planning procedure.

A competent workforce also includes PwDs. Hence, encourage the creation and sale of additional services and products aimed at PwDs as well as the accessibility of offices, market, shopping complexes, information technology and transit services are necessary. Every actor, especially municipal engineers and technical personnel, must receive instruction as well as direction on inclusivity in public buildings. To encourage accessible tourism in Nepal, all tourist destinations—including those that are World Cultural Heritages—should be made accessible to everyone, including those with disabilities. Personal transportation services must be made available for everyone, giving PwDs the same opportunity as everyone else.

3.3   Access Audit: Public Buildings

The purpose of the access audit is to assess Patan's public buildings in regards to accessibility provisions and to test whether or not the design is compliant to the guidelines. In order to analyze the availability accessible features in physical surroundings, the UN Design Manual is utilized to assess urban design application in the 10 prominent public buildings.

Its checklist consists of the following ten groups:

1.   Ramps

2.   Elevators

3.   Platform Lifts

4.   Stairs

5.   Railings & Handrails

6.   Entrances

7.   Doors

8.   Corridors

9.   Restrooms

10.   Parking
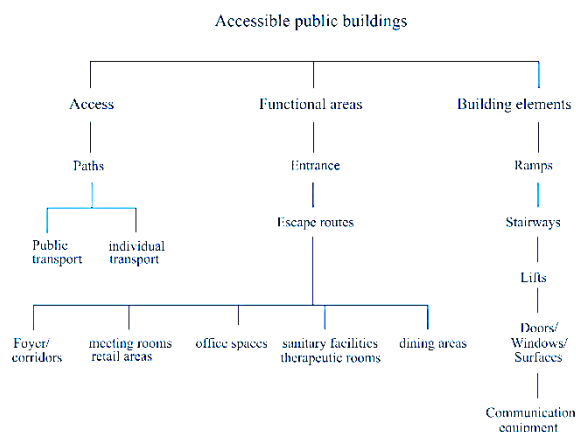
Figure 3-32 Components of an accessible public building

These ten components were evaluated independently based on 85 specific elements (see Table for details of assessment criteria). A rating scale of 1 to 5 is used as mentioned in chapter 3.1.

Notes:
- Not Available (-)
- Not Accessible (NA)
- Partially Accessible (PA)
- Accessible (A)
- Fully Accessible (FA)

The research was carried out on June-July 2022 by the author. 85 components for each building complex were assessed as accessible or not accessible to PwDs based on the appropriate specification.

Observation Result

The access audit demonstrates the compliance of various public infrastructures with the accessibility guidelines provided by the UN Design Manual.

Table 3-3 Access Audit: Public Buildings

Accessibility compliance

S.N. Technical guidelines	District Court	Malpot Office	Nepal Bank	Municipality	Namuna Machh	Patan Hospital	District Office	Pulchowk Campus	Labim Mall	NTC Office
1 RAMPS										
Ramp configuration	-	FA	-	-	FA	FA	FA	FA	FA	-
Width (min 0.9m)	-	FA	-	-	FA	FA	FA	FA	PA	-
Slope	-	FA	-	-	FA	FA	FA	FA	FA	-
Landings	-	A	-	-	-	-	A	A	FA	-
Handrail	-	FA	-	-	FA	FA	FA	FA	FA	-
Surface	-	-	-	-	-	-	-	-	-	-
Tactile marking	-	-	-	-	-	-	-	-	-	-
Obstacles	-	FA	-	-	FA	FA	FA	FA	A	-
Location	-	FA	-	-	FA	A	FA	FA	FA	-
2 ELEVATORS										
Accessible path	-	-	-	FA	-	FA	-	-	FA	-
Accessibility to all levels	-	-	-	FA	-	FA	-	-	FA	-
Elevator cab	-	-	-	FA	-	FA	-	-	FA	-
Control panel	-	-	-	A	-	A	-	-	A	-
Audiovisual signals	-	-	-	A	-	A	-	-	A	-
Floor surface	-	-	-	FA	-	FA	-	-	FA	-
Colour	-	-	-	FA	-	FA	-	-	FA	-
Opening/closing interval	-	-	-	FA	-	FA	-	-	A	-
Floor number in braille	-	-	-	A	-	-	-	-	A	-
3 STAIRS										
Width (min 1.5m)	FA	FA	FA	FA	FA	FA	FA	FA	A	FA
Landing (min 1.2m)	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
Nosing (40mm)	PA	PA	PA	FA	FA	FA	FA	FA	FA	FA
Handrails (0.5m-0.9m)	A	A	A	FA	A	FA	A	A	PA	-
Tactile marking (min 0.6m wide)	-	-	-	-	FA	-	-	-	PA	-
Emergency stairs	-	-	-	-	-	-	-	-	FA	-
Mechanical stairs (escalators)*	-	-	-	-	-	-	-	-	-	-
Intermediate Handrails*	-	-	-	A	-	-	-	-	-	-
Location of staircase	FA	FA	FA	A	FA	A	FA	FA	A	FA
4 RAILINGS AND HANDRAILS										
Easy to grip	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
Securely attached	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
Horizontal extension (0.3-0.45m)	PA	PA	PA	PA	PA	PA	PA	PA	FA	FA
Continuous throughout the full length	FA	FA	FA	FA	FA	FA	FA	FA	PA	FA
Low positioned windows at landings	FA	A	FA	FA	PA	FA	FA	-	A	FA
Space between handrail & wall (40-60mm)	-	-	-	-	-	-	-	-	-	-
Easy to identify	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
Distance between handrails (0.9-1.4m)	-	-	-	-	-	-	-	-	-	-
Intermediate handrails*	-	-	-	-	-	-	-	-	-	-
Height (0.85-0.9m)	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA

S.N. Technical guidelines

Accessibility compliance

S.N. Technical guidelines	District Court	Malpot Office	Nepal Bank	Municipality	Namuna Machh	Patan Hospital	District Office	Pulchowk Campus	Labim Mall	NTC Office
4 RAILINGS AND HANDRAILS										
Easy to grip	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
Securely attached	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
Horizontal extension (0.3-0.45m)	PA	PA	PA	PA	PA	PA	PA	PA	FA	FA
Continuous throughout the full length	FA	FA	FA	FA	FA	FA	FA	FA	PA	FA
Low positioned windows at landings	FA	A	FA	FA	PA	FA	FA	-	A	FA
Space between handrail & wall (40-60mm)	-	-	-	-	-	-	-	-	-	FA
Easy to identify	FA	-	FA	-	FA	FA	FA	FA	FA	FA
Distance between handrails (0.9-1.4m)	-	-	-	-	-	-	-	-	-	-
Intermediate handrails*	-	-	-	-	-	-	-	-	-	-
Height (0.85-0.9m)	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
5 ENTRANCES										
Accessible primary entrances	NA	FA	-	A	FA	FA	FA	PA	FA	NA
Access to conveniently located elevator	-	-	-	A	-	A	-	-	FA	NA
Clearly identifiable	FA	FA	FA	PA	FA	FA	FA	FA	FA	FA
Landing dimensions	FA	FA	PA	FA	FA	FA	FA	FA	FA	FA
Landing surface	A	A	PA	A	FA	FA	FA	FA	FA	FA
Doors operate independently	FA	A	PA	A	FA	FA	FA	FA	FA	FA
Clear door width (at least 0.90 m)	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
6 DOORS										
Door opening	FA	FA	FA	FA	FA	FA	FA	FA	FA	PA
Signage	A	A	PA	A	A	A	A	PA	A	A
Color	FA	FA	PA	FA	FA	FA	FA	FA	A	FA
Opened without much effort	FA	FA	FA	FA	FA	PA	PA	PA	PA	FA
Opening interval	-	-	-	-	-	-	-	-	FA	-
Push-buttons for automatic doors (1.2-1.4m)	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
Clear width of interior doors (0.8 m)	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
Double leaf door (leaf width= 0.8m)	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
Shape of handle	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
Ht. of handles, locks, pulls (1.2-1.40m)	PA	PA	FA	FA	FA	FA	FA	FA	PA	NA
Threshold	PA	PA	PA	FA	FA	FA	FA	FA	FA	NA

S.N. Technical guidelines

Accessibility compliance

S.N.	Technical guidelines	NTC Office	Labim Mall	Pulchowk Campus	District Office	Patan Hospital	Namuna Machh	Municipality	Nepal Bank	Malpot Office	District Court
7	**CORRIDORS**										
	Width (min 0.90 m)	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Maneuvring through doors	PA	PA	FA	FA	FA	FA	FA	FA	FA	FA
	Differences in level bridged by ramps	NA	A	NA	PA	FA	FA	-	-	FA	-
	Obstruction	A	FA	FA	FA	FA	FA	FA	FA	A	FA
	Surface	A	A	FA	FA	A	A	A	PA	FA	A
	Signage	A	FA	PA	A	A	FA	-	-	A	A
	Tactile marking	-	FA	-	-	FA	FA	-	-	-	-
	Handrails	-	-	-	-	FA	FA	-	-	-	-
8	**REST ROOMS**										
	Accessibility	NA	FA	NA	NA	PA	FA	NA	NA	NA	NA
	Signage	-	FA	PA	A	A	A	A	A	A	A
	Threshold	NA	FA	NA	NA	PA	FA	NA	NA	NA	NA
	Fixtures										
	WC/bidets ht. (0.45-0.5m)	NA	FA	NA	NA	FA	FA	NA	NA	NA	NA
	Distance bet. toilet seat & wall (0.45-0.5m)	A	FA	PA	PA	FA	FA	PA	PA	PA	PA
	Wash-basin height (0.80 m-0.85 m)	NA	FA	PA	PA	PA	FA	NA	NA	NA	NA
	Grab bars height (0.85 m -0.95 m)	-	FA	-	-	-	FA	-	-	-	-
	Grab bars diameter (30 mm-40 mm)	-	FA	-	-	-	FA	-	-	-	-
	Grab bars clearance (35 mm-40 mm)	-	FA	-	-	-	FA	-	-	-	-
	Grab Bar Texture	-	FA	-	-	-	FA	-	-	-	-
	Grab bar Strength	-	FA	-	-	-	FA	-	-	-	-
	Faucets										
	Easy to grip and operable with one hand	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Pipes										
	Are hot water pipes insulated or covered?	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Accessories and controls										
	Mirror ht (max. 1m)	NA	FA	NA	NA	NA	-	NA	NA	NA	NA
	Alarm system	NA	-	-	NA	NA	-	-	-	-	-
	Wall mounts ht (0.5-1.2m)	NA	FA	-	NA	NA	-	-	-	-	-
	Flushing mechanisms easy to operate	FA	FA	-	FA	FA	FA	FA	FA	FA	FA
	Flooring										
	Skid-proof, well drained and waterproofed	PA	FA	PA	NA	PA	FA	PA	PA	PA	PA
	Doors										
	Opening (min 0.75 m)	A	FA	-	A	PA	FA	A	A	A	A
	Releasable from outside (emergency)	NA	NA	NA	NA	PA	FA	NA	NA	NA	NA
	Do pivoted doors open outward?	NA	FA	NA	NA	NA	FA	NA	NA	NA	FA
9	**PARKING**										
	Number (1:50)	-	FA	-	-	-	FA	-	-	-	-
	Location	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Dimensions (3.60 m)	FA	FA	PA	PA	FA	FA	PA	PA	PA	PA
	Drop-off areas (3.6m +1.2m)	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Surface	-	FA	-	FA	A	-	FA	FA	FA	FA
	Signage										

3.3.1 District Court, Lagankhel

Figure 3-33 District Court, Lagankhel

Analysis of Assessment

Type of Building: Government Institution

Location: Lagankhel, Lalitpur

Year of Establishment: 2060 B.S.

In case of the District Court of Lalitpur, both accessibility to the space and accessibility within the space to ensure the access of PWDs approaching the area are entirely denied. Accessibility to space is provided by footpath and entrance. Observations on their respective performances are discussed next.

Approaching the Infrastructure

- Absence of tactile tiles

- The area around the obstruction lacks tactile indication.

- There are no curb ramps for level variations on the footpath.

- Footpaths on the roadside provide access to the infrastructure.

- Ragged Surface

Accessibility in the Infrastructure

- No provision of ramp at the entrance or inside the building.

- No provision of elevators to access upper floor levels.

- No provision of Lifts

- Railing only on one side of the stairs

- Entrance threshold not accessible

- Height of door handle placement not accessible

- No provision of handrails in corridors

- Signage not available in Braille

- Sanitary facilities entirely inaccessible.

- Unmanaged and poor parking facilities.

- There are no parking spaces designated for disabled individuals.

- No provision of emergency exit.

3.3.2 Lalitpur Land Revenue Office, Lagankhel

Figure 3-34 Lalitpur Land Revenue Office, Lagankhel

Analysis of Assessment

Type of Building: Government Institution

Location: Lagankhel, Lalitpur

Year of Establishment: 2059 B.S.

In case of the Land Revenue Office of Lalitpur, both accessibility to the space and accessibility within the space to ensure the access of PWDs approaching the area are not up to standards.

Approaching the Infrastructure

- There aren't any curb ramps on the sidewalk for level variations.

- No tactile blocks on the footpath.

- Sidewalks provide access to the facility.

- The area surrounding the obstacle has no tactile indicators.

- Ragged Surface

- Absence of Signage

- Disruptions in the travel path that are uncomfortable or hazardous.

- Curbs with potholes and irregular surfaces.

- Surface quality**:** The paving on the pathway is rubble concrete surface. Sometimes the surface is fragmented, cracked and uneven, which is challenging for the easy and smooth movement of the wheelchair users.

- Roadblocks on the paths preventing entry.

- Inaccessible curb ramps.

- No segregation of pedestrian path and vehicular path.

- Parking spaces and other barriers restrict access to the ramp.

- Unmanaged parking on the street.

- No ramp is available.

- The majority of locations lack handrails. The existing handrails are inappropriate.

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- The ramp's width is not up to code.

- The ramp's slope is not appropriate.

- Rugged and unsteady paths around the infrastructure.

- No established suitable paths.

- Inadequate indicators, markings and signage.

Accessibility in the Infrastructure

- No provision of ramp at the entrance or inside the building.

- No provision of elevators to access upper floor levels.

- No provision of Lifts

- Railing only on one side of the stairs

- Entrance threshold not accessible

- Height of door handle placement not accessible

- No provision of handrails in corridors

- Signage not available in Braille

- Sanitary facilities entirely inaccessible.

- Unmanaged and poor parking facilities.

- Absence of designated parking spot for PwDs.

3.3.3 Nepal Bank, Gabahal

Figure 3-35 Nepal Bank, Gabahal

Analysis of Assessment

Type of Building: Government Institution

Location: Gabahal, Lalitpur

In case of Nepal Bank at Gabahal, both accessibility to the space and accessibility within the space to ensure the access of PWDs approaching the area are entirely unavailable.

Approaching the Infrastructure

- Roads are not equipped with sidewalks.

- No tactile blocks on the path.

- Unmanaged parking on the street.

- No segregation of pedestrian path and vehicle path.

Accessibility in the Infrastructure

- No provision of ramp at the entrance or inside the building.

- No provision of elevators to access upper floor levels.

- No provision of Lifts

- Railing only on one side of the stairs

- Entrance threshold not accessible

- Height of door handle placement not accessible

- No provision of handrails in corridors

- Signage not available in Braille

- Sanitary facilities entirely inaccessible.

- Unmanaged and poor parking facilities.

- Absence of designated parking spot for PwDs.

3.3.4 Lalitpur Metropolitan City Office, Pulchowk

Figure 3-36 Lalitpur Metropolitan City Office, Pulchowk

Analysis of Assessment

Type of Building: Government Institution

Location: Pulchowk, Lalitpur

Year of establishment: 2049 B.S

In case of the Metropolitan City Office of Lalitpur, accessibility to the space and accessibility within the space to ensure the access of PWDs approaching the area are fairly satisfactory but not completely up to standards.

Approaching the Infrastructure

- Sidewalks provide access to the facility.

- There aren't any curb ramps on the sidewalk for level variations.

- No tactile blocks on the footpath.

- No tactile warning markings on the ground around changes in level.

- Several changes in level at the outdoor open park area.

Accessibility in the Infrastructure

- No provision of ramp at the entrance or inside the building.

- Access to elevator obstructed by random objects on the path.

- Elevator buttons placed too high.

- Porch threshold not accessible

- Lack of signage on doors.

- No provision of handrails in corridors

- Signage not available in Braille

- Sanitary facilities are entirely inaccessible.

- Unmanaged and poor parking facilities.

- Absence of designated parking spot for PwDs.

3.3.5 Namuna Machhindra School, Lagankhel

Figure 3-37 Namuna Machhindra School, Lagankhel

Analysis of Assessment

Type of Building: Educational Institution

Location: Lagankhel, Lalitpur

Year of Establishment: Bhadra 2077 B.S.

In case of the Namuna Machhindra School at Lagankhel, accessibility to the infrastructure is not well-maintained. However, accessibility within the infrastructure to ensure the access of PWDs approaching the area are fairly up to standards.

Approaching the Infrastructure

- There aren't any curb ramps on the sidewalk for level variations.

- Sidewalks provide access to the facility.

- No tactile blocks on the footpath.

- Disruptions in the pathway that are uncomfortable or hazardous.

- Absence of tactile indicators on the ground around changes in level or obstructions.

- Ragged Surface

- Curbs with potholes and irregular surfaces.

- Unmanaged parking on the street.

- No segregation of pedestrian path and vehicle path.

Accessibility in the Infrastructure

- Provision of ramps at various places.

- No provision of elevators to access upper floor levels.

- Railing at both side of the stairs.

- Tactile tiles o the corridors.

- Provision of handrails in corridors.

- Signage not available in Braille.

- Separate accessible sanitary facilities for PWD students.

- Absence of designated parking spots for PwDs.

- No emergency exits.

3.3.6 Patan Hospital, Lagankhel

Figure 3-38 Patan Hospital, Lagankhel

Analysis of Assessment

Type of Building: Government Health Institution

Location: Lagankhel, Lalitpur

Year of Establishment:

       Old building: 2049 B.S.

Nix Simon Building: 2058 B.S.

New Block: 2068 B.S.

In case of Patan Hospital at Lalitpur, both accessibility to the space and accessibility within the space to ensure the access of PWDs approaching the area are unsatisfactory and not up to standards.

Approaching the Infrastructure

• Sidewalks provide access to the facility.

• Absence of curb ramps on the sidewalk for level variations.

• No tactile tiles on the footpath.

• Absence of tactile indicators on the ground around changes in level or obstructions.

Figure 3-39 Entrance to Hospital Block

• Ragged Surface

• Absence of Signage

• Curbs with potholes and irregular surfaces.

• Disruptions in the pathway that are uncomfortable or hazardous.

• Several changes in level at the outdoor open park area.

• Unmanaged parking on the street.

Accessibility in the Infrastructure

- Provision of ramp to access all floors in the buildings.

- Inadequate provision of ramps- Several large blocks share the same ramp.

- Provision of elevators to access upper floor levels.

- Wheelchair facility at the entrance.

- Railing on two sides of the staircase

- Height of door handle placement not accessible

- No provision of handrails in ground floor corridors

- Signage not available in Braille

- Sanitary facilities are mostly inaccessible; especially in emergency and general wards.

- Unmanaged and poor parking facilities.

- Absence of designated parking spots for PwDs.

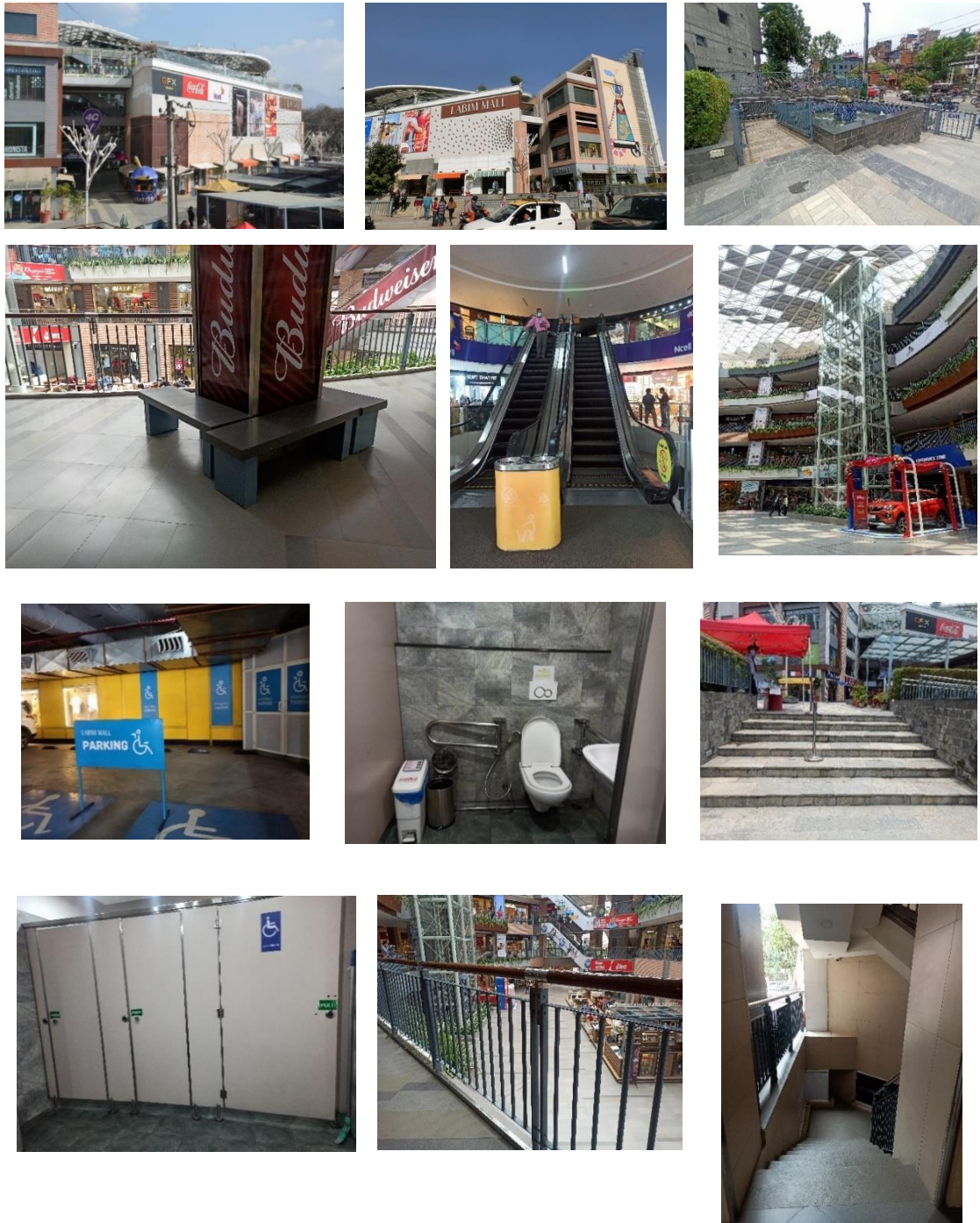**Figure 3-40 Ramp Connecting All Floors**

3.3.7   Labim Mall, Pulchowk

Figure 3-41 Labim Mall, Pulchowk

Analysis of Assessment

Type of Building: Commercial Complex

Location: Pulchowk, Lalitpur

In case of the Labim Mall at Pulchowk, accessibility within the space to ensure the access of PWDs approaching the area are up to standards even though accessibility to the facility is only.

Approaching the Infrastructure

- Sidewalks provide access to the facility.

- Absence of curb ramps on the sidewalk for level variations.

- No tactile blocks on the footpath.

- Curbs with potholes and irregular surfaces.

- Disruptions in the pathway that are uncomfortable or hazardous.
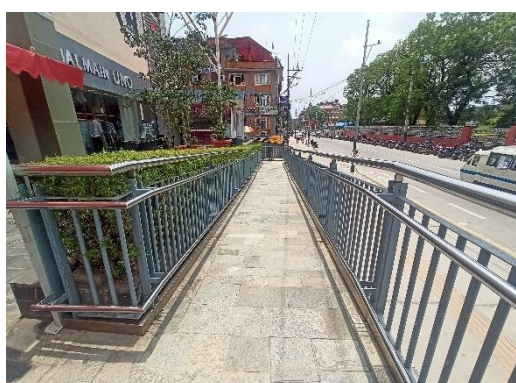
- Absence of Signage

Figure 3-42 Ramp at one of the entrances

- Provision of ramp at al entrances.

- Turning radius of entrance ramp not up to standard.

- Access from the ramp locked behind bars and not made readily available.

Accessibility in the Infrastructure

- Provision of elevators and escalators to access upper floor levels.

- No provision of tactile markers for people with visual impairities.

- Doors to individual shops are not easy to maneouvre.

- Signage not available in Braille

- Designated sanitary facilities for PWDs.

- Well-managed parking facilities.

- Designated parking spots for PwDs.

Figure 3-43 Accessible signage and tactile markings

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3.3.8   Pulchowk Campus
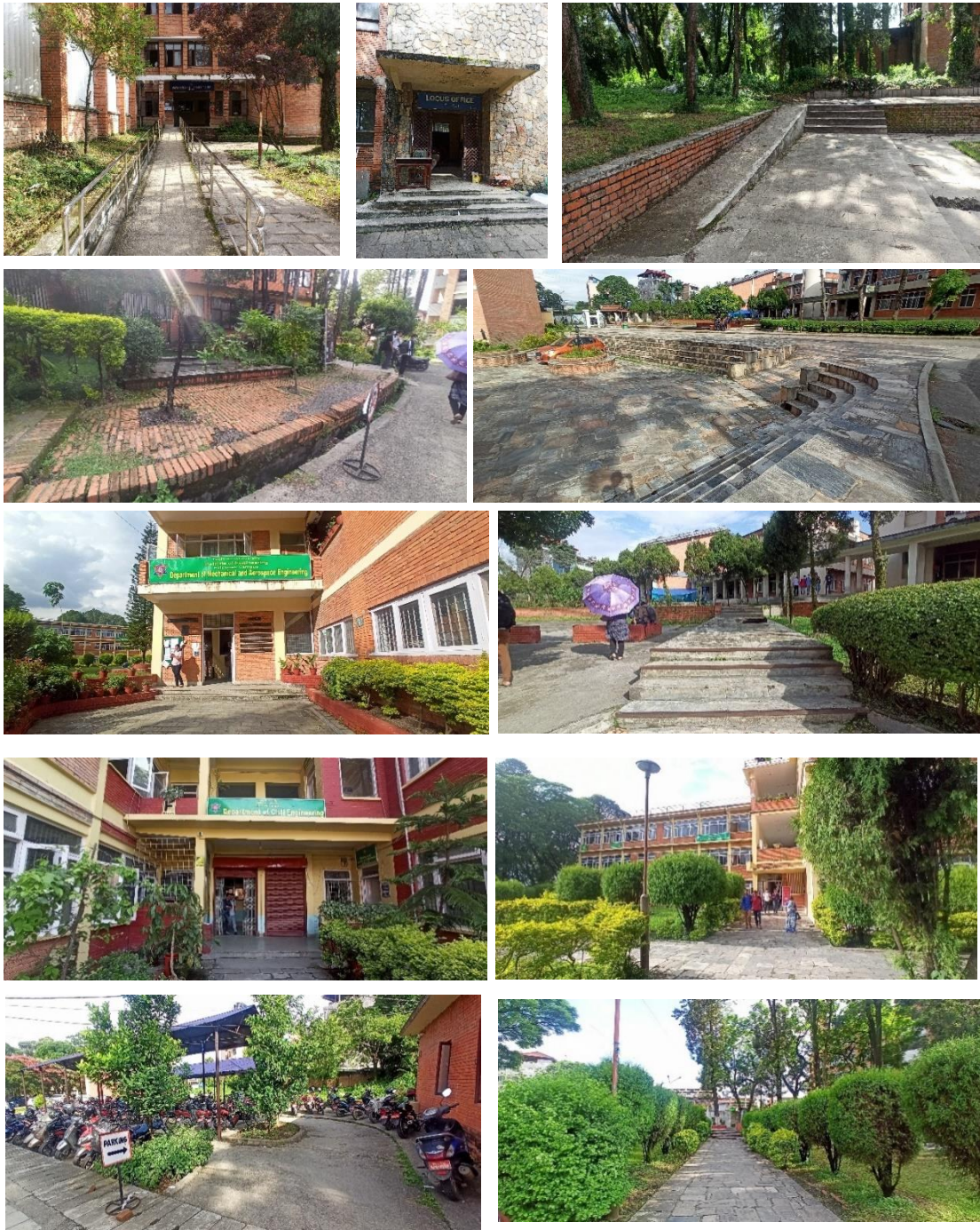
Figure 3-44 Pulchowk Campus

Approaching the Infrastructure

- Sidewalks provide access to the facility.

- Absence of curb ramps on the sidewalk for level variations.

- Tactile tiles on the footpath.

- No traffic lights available for ease of crossing road.

Figure 3-45 Inaccessible Entrance at Admin Block

Accessibility in the Infrastructure

- No provision of ramp at the entrance or inside most blocks.

- No provision of elevators to access upper floor levels.

- Railing only on one side of the stairs

- Height of door handle placement not accessible.

- No provision of handrails in corridors

- Signage not available in braille.

- Sanitary facilities entirely inaccessible.

- Absence of designated parking spots for PwDs.

Figure 3-46 Inaccessible Entrance

Figure 3-47 Inaccessible Upper Floors and Thresholds

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3.3.9 Nepal Telecom Office, Jawalakhel

Figure 3-48 Nepal Telecom Office, Jawalakhel

Analysis of Assessment

Type of Building: Government Institution

Location: Jawalakhel, Lalitpur

In case of Nepal Telecom Office at Jawalakhel, both accessibility to the space and accessibility within the space to ensure the access of PWDs approaching the area are not up to standards.

Approaching the Infrastructure

- No sidewalks to provide access to the facility.

- Absence of Signage

- Disruptions in the pathway that are uncomfortable and hazardous.

- Lack of properly distinguishable pathways.

- Slope of the ramp do not meet standard.

- Unmanaged parking on the street.

- No segregation of pedestrian path and vehicle path.

Accessibility in the Infrastructure

- No provision of ramp at the entrance or inside the building.

- No provision of elevators to access upper floor levels.

- Railing only on one side of the stairs

- Entrance threshold not accessible

- Height of door handle placement not accessible

- No provision of handrails in corridors

- Signage not available in Braille

- Sanitary facilities entirely inaccessible.

- Unmanaged and poor parking facilities.

- Absence of designated parking spots for PwDs.

3.3.10 Lalitpur District Administration Office, Thasikhel

Figure 3-49   **Lalitpur District Administration Office**

Analysis of Assessment

Type of Building: Government Institution

Location: Thasikhel, Lalitpur

Year of Establishment: 2075 B.S- 2076 B.S.

In case of the District Administration Office of Lalitpur, both accessibility to the space and accessibility within the space to ensure the access of PWDs approaching the area are not up to standards.

Approaching the Infrastructure

- No sidewalks to provide access to the facility.

- Absence of curb ramps on the sidewalk for level variations.

- No tactile blocks on the footpath.

- Absence of Signage

- No proper pathways defined.

- Unmanaged parking on the street.

- No segregation of pedestrian path and vehicle path.
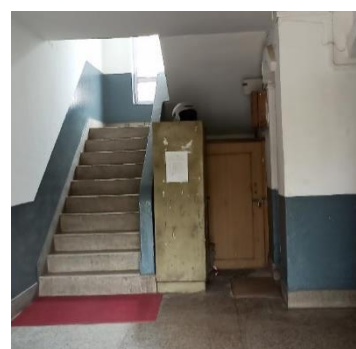
Accessibility in the Infrastructure

- No provision of ramp in entrances of most blocks.

- No provision of elevators to access upper floor levels.

- Railing only on one side of the stairs

- Height of door handle placement not accessible

- No provision of handrails in corridors

- Signage not available in Braille

- Sanitary facilities entirely inaccessible.

- Unmanaged and poor parking facilities.

- Absence of designated parking spots for PwDs.

Figure 3-50 Inaccessible Upper Floors

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Observation results

As a result of the research, it can be claimed that the majority of the examined facilities do not fully meet the accessibility requirements for PwDs because none of the studies buildings demonstrated complete conformity with the standard specifications. Namuna Macchindra School earned the highest compliance rate, with an overall accessibility percent of 85.29%. However, the study's overall findings indicated that accessibility is not well-designed into public facilities.

Formula for Calculation of Compliance score=

$$\frac{\substack{\text{(Not available x 0)+ (Not Accessible x 0)+ (Partially Accessible x 0.5)+} \\ \text{(Accessible x 0.75)+ (Fully Accessible x 1)}}}{\textit{Total number of items}} \text{ x 100 \%}$$

Table 3-4 Compliance Score Chart: Public Buildings

	0	NA (0)	PA (0.5)	A (0.75)	FA (1)	Compliance Score
District Court	31	7	6	10	31	48.82
Malpot Office	24	6	5	12	38	58.24
Nepal Bank	33	7	10	4	31	45.88
Municipality	21	7	4	4	39	51.76
Namuna Machh	17	0	2	6	60	77.06
Patan Hospital	13	3	6	9	54	75.00
District Office	24	8	6	6	41	57.06
Pulchowk Campus	26	8	9	2	40	54.12
Labim Mall	5	1	7	12	60	85.29
NTC Office	31	14	3	5	32	43.82

The highest compliance on accessibility were found in Labim Mall (85.29%), Namuna Machhindra School (77.06%) and Patan Hospital (75.0%). Indeed, Labim Mall is a relatively new space, and was designed with accessibility in consideration. Namuna Machhindra too is a newly constructed building designed with the consideration of accessibility for its students with physical and visual impairments. Patan Hospital scores 75% which is still inadequate for a public health institution. This deficiency could be attributed to the fact that the hospital is a relatively older construction which lacks maintenance and updating. The lowest compliances were found at NTC Office (43.82%) and District Court (48.82%). The majority of the components in these two buildings are poorly designed, for example inaccessible entrances, upper floors, toilets, etc.

3.4   Interviews with Building Managers/ Officers

This section of the study focuses on the data collection process for interviews about the use of universal design in Patan's public buildings. The main issues are the true meaning of universal design and public awareness of PWD rights. The stated objectives were to determine how much building managers, authorities, and officers understood and perceived the present and upcoming strategies for the buildings' accessibility, and also to assess their familiarity with the UD concept. Semi-structured interview was conducted with building managers from ten prominent public buildings in Patan. The results demonstrate that building managers need to have a better understanding of universal design.

3.4.1   District Court, Lagankhel

Name of Interviewee: Krishna Bahadur Gurung

Post: Section Officer

Q: Understanding about universal design

A: The interviewee had limited knowledge about PWD rights and Universal Design. Through the course of the interview, the interviewee seemed to develop a positive attitude towards UD and expectation for improvement in present condition of accessibility is expressed.

Q: Building compliance to universal design theory

The building design has not considered any sort of accessibility features for PWDs.

Q: Current plans for accessibility

A: The number of PWD visiting the facility is very low. The PWD who seek services at the court are generally elderly citizens who wish to pass on their property to their children. Hence, service is provided at the drop-off area where employees of the court themselves go to the PWD and help them with whatever is required. There is no provision for wheelchair users to enter the building. PWDs are required to bring a carer to go into and around the building.

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Q: Future plan to improve accessibility

A: There are no future plans, as of now, for the provision of accessibility in the building. The process to get any sort of construction and maintenance work done in the building is tedious, since it has to be passed on and approved by many departments, which takes a very long time. An elevator in the lobby could be designed for ease of movement to all floor levels.

Figure 3-51 Location Map: District Court, Lagankhel

Figure 3-52 Interview with the Section Officer

3.4.2 Land Revenue Office, Lagankhel

Name of Interviewee: Bishnu Prasad Ghimire

Post: Officer

Q: Understanding about universal design

The interviewee had good knowledge about PWD rights and Universal Design and had a progressive mindset. According to the interviewee, accessibility is the ability of a space to be equally practical for all consumers, irrespective of their capabilities, ages, ethnicities, and religions.

Q: Building compliance to universal design theory

The building design has not considered accessibility features for PWDs to a great extent except for the ramps at the entrance.

Q: Current plans for accessibility

A: The number of PWD visiting the facility is very low. All basic services have been accommodated at the ground floor for the convenience of visitors. A breastfeeding

room has been provided near the entrance of the building. There is no provision for wheelchair users to get to the upper floor. PWDs are required to bring a carer to go into and around the building. One of the main problems is that the toilets are entirely inaccessible and lacks maintenance.

Q: Future plan to improve accessibility

A: There are no future plans to improve accessibility in the building. The process to get any sort of construction and maintenance work done in the building is tedious, since it has to be passed on and approved by many departments, which takes a very long time.

The facility is running out of space due to rapid increase of population in Lalitpur. It is already hard to function in the present condition and the office cannot run smoothly if it doesn't shift or expand its area in the next couple years. Maybe then, accessible design can be incorporated into the new building.

Proper digitization of services can hugely impact the ease with all customers can use the services. It will allow customers to access the services remotely without having to visit the facility themselves.
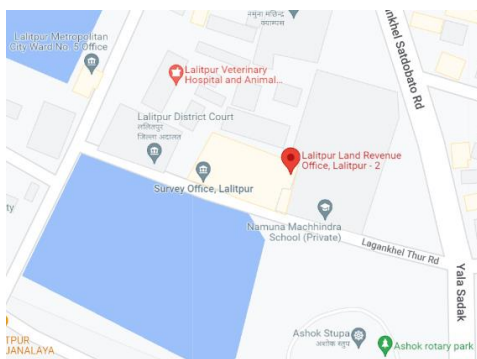
Figure 3-53 Location Map: Lalitpur Land Revenue Office

Figure 3-54 Interview with the Officer

3.4.3   Nepal Bank, Gabahal

Name of Interviewee: Kiran Dangol

Post: Branch Manager

Q: Understanding about universal design

The interviewee had good knowledge about PWD rights and Universal Design and had a progressive mindset. According to the interviewee; UD is a concept of designing built

environment which is usable by all types of consumers, including those who are impaired and those who are not. Dissatisfaction was expressed at the lack of accessibility features in the building by the interview. The interviewee was well versed on PWD rights and was cooperative regarding the notion of independent mobility for PWDs.

Q: Building compliance to universal design theory

The building design has not considered any accessibility features for PWDs.

Q: Current plans for accessibility

A: The number of PWD visiting the facility is very low. All basic services is provided at the ground floor for the convenience of visitors. The number of PWD visiting the facility is very low. Hence, service is provided at the drop-off area where employees themselves go to the PWD and help them with whatever is required. Employees also visit the customer at their residence, office or hospital in special cases. There is no provision for wheelchair users to enter the building. PWDs are required to bring a carer to go into and around the building.

All basic services are provided at the ground floor for the convenience of customers. There is no provision for wheelchair users to get to the upper floor. PWDs are required to bring a carer to go into and around the building.

Q: Future plan to improve accessibility

A: There are no future plans to improve accessibility in the building. The process to get any sort of construction and maintenance work done in the building is tedious, since it has to be passed on and approved by many departments, which takes a very long time.

Proper digitization of services can hugely impact the ease with all customers can use the services. It will allow customers to access the services remotely without having to visit the facility themselves. Enhanced surveillance of all areas in the bank can also help in watching out for any PWD customers in need of assistance at any time.

Budget allocation for accessible design was suggested. Other recommendations include design of elevators, renovation of exterior and interior of the building to incorporate accessible design. New technologies and modern amenities need to be embraced.

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Building components such as surveillance and finishing materials have to be disability friendly to the highest extent possible in public buildings such as this bank.

The main problem in the country is that policies are rarely fully implemented. It is a question of awareness in the government system and authority level. It depends on the literacy of taxpayers to bring about the improvements in universal design and digitization of services in order to make the services accessible to not only PWDs but all citizens. As per the current bidding policy, rented building are being used to operate many branches of public service institutions in the city. These buildings are usually old, with out-of-date design and planning and completely lacks accessible design features. Everyone talks about service becoming digital , paperless and modernized, but the truth is that the government's banking system is still following traditional ways. The culture of acquiring commissions in illegal ways at different levels of authority is to be blamed to a great extent. Nevertheless, people who wish to bring about change in the society must not be disheartened by the lack of response to initiatives, follow-up and implementation by the government.

Figure 3-55 Location Map: Nepal Bank, Gabahal

Figure 3-56 Interview with the Branch Manager

3.4.4 Lalitpur Metropolitan City Office, Pulchowk

Name of Interviewee: Srijana Mahat

Post: Civil Engineer

Q: Understanding about universal design

The interviewee had good knowledge about PWD rights and Universal Design. According to the interviewee, all individuals of the community, including those with impairments and those who are able-bodied, must be considered in UD. Inclusive design must also incorporate women-centric features such as breast-feeding room, day care centres, provision of sanitary pads, etc.

Q: Building compliance to universal design theory

A: An elevator has recently been installed in the lobby to enhance accessibility in the building. Besides that, not much consideration has been given to accessibility in the building complex.

Q: Current plans for accessibility

A: An elevator has recently been installed in the lobby to enhance accessibility in the building.

Q: Future plan to improve accessibility

A: A new building complex is currently being built nearby. The new building shall have improved features such as elevator, ramps, tactile tiles and accessible toilets.

Figure 3-57 Location Map: Lalitpur Metropolitan City Office

3.4.5   Namuna Machhindra School, Lagankhel

Name of Interviewee: Radha Krishna Mahat

Post: Principal

Name of Interviewee: Chiri Maya Maharjan (PWD)

Post: Teacher

Name of Interviewee: Bed Maya Dhakal (PWD)

Post: Teacher

Q: Understanding about universal design

The interviewees had good knowledge about PWD rights and Universal Design and had a progressive mindset. They were also experienced on the subject of problems and obstacles faced by students and teachers with disabilities when accessible is not available.

Q: Building compliance to universal design theory

A: The school complex was built with the help of Japanese Aid. Accessibility features catering to students with disabilities has been incorporated into the design. There are 500 students currently enrolled at the school, out of which 37 have some kind of impairment. A total of 16 students with impairments use the boarding facilities. Furthermore, two of the faculty members have mobility impairments and one is visually impaired. Since this is an inclusive institution, disability-friendly features, special equipment and teaching methods have been of utmost importance.

**Q: Current plans for accessibility**

A: Accessibility features such as ramps, handrails in corridors, special toilets and wash area, tactile markings on the floor, and special learning materials and equipment for students with visual impairments, etc. is provided.

Q: Future plan to improve accessibility

A: Elevators in the school and hostel buildings is required to enhance the accessibility for students and teachers with disabilities in the school. Maintenance and construction is tedious to carry out since the school has to rely on aid from the Japanese or Nepalese government.

Figure 3-58 Interview with the Teachers
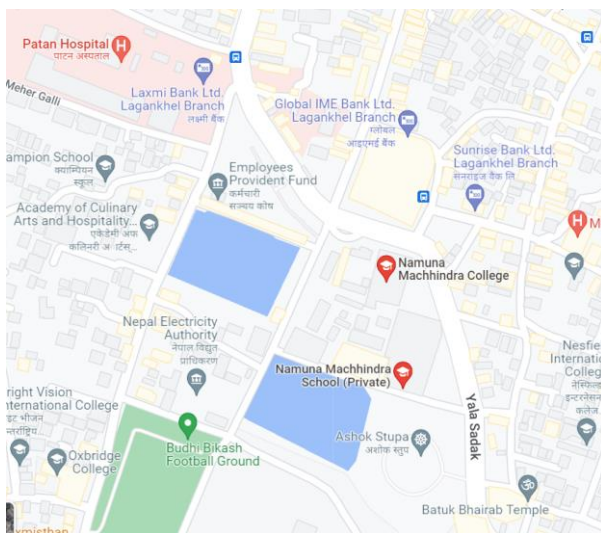
Figure 3-59 Location Map: Namuna Machhindra School

3.4.6 Patan Hospital

Name of Interviewee: Nila Raj Acharya

Post: Administrative Officer

Q: Understanding about universal design

The interviewee had good knowledge about PWD rights and Universal Design. The interviewee seemed well aware of the importance of disability-friendly design and facilities in a hospital setting.

Q: Building compliance to universal design theory

A: All floors of the hospital can be accessed through a ramp. The new and old blocks share the same ramp.

**Q: Current plans for accessibility**

A: Around 2000-2500 people visit the hospital premises per day, out of which 100 are wheelchair users or chronically disabled people. Accessibility features such as ramps, handrails in stairs, elevators, and wheelchair service are provided to facilitate PWDs. Security personnel and volunteers are deployed at the entrance in order to spot people in need of assistance.

Q: Future plan to improve accessibility

A: A new block is to be made in the complex where accessibility features such as ramps, elevators, accessible toilets, etc shall be incorporated.

Figure 3-60 Location Map: Patan Hospital
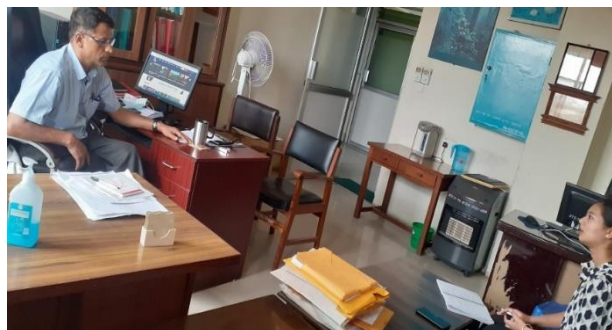
Figure 3-61 Interview with the Administrative Officer

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3.4.7 Labim Mall

Name of Interviewee: Sulav Shrestha

Post: Operations Manager

Q: Understanding about universal design

The interviewee had good knowledge about PWD rights and Universal Design. The interviewee seemed well aware of the importance of disability-friendly design and facilities in a public commercial complex.

Q: Building compliance to universal design theory

A: The facility has considered accessibility features for PWDs in order to make their visit to the mall a positive experience.

Q: Current plans for accessibility

A: The rate at which customers with disability visiting the mall is very low. Nevertheless, two different entrances of the mall can be accessed through ramps. The parking area has 2 designated spots for PWDs. All floors of the mall can be accessed through a central elevator and escalators. The bathrooms have designated accessible toilets for PWDs.

Q: Future plan to improve accessibility

A: No future plans to improve accessibility exist as of yet. However, audio and braille markers could be incorporated into signage. Tactile tiles could prove to be a useful element to facilitate independent mobility for people with visual imparities. The emergency exit design could be reconsidered to make it more accessible to PWDs.
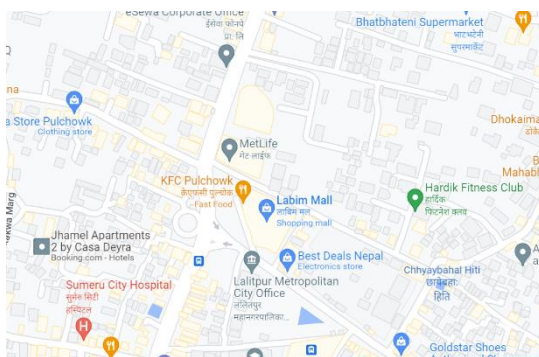
Figure 3-63 Location Map: Labim Mall

Figure 3-62 Interview with the Operations Manager

3.4.8 Pulchowk Campus

Name of Interviewee: Assoc. Prof. Dr. Indra Prasad Acharya

Post: Campus Chief

Q: Understanding about universal design

The interviewee had good knowledge about PWD rights and Universal Design. The interviewee seemed well aware of the importance of inclusive design and facilities in an educational education.

**Q: Building compliance to universal design theory**

A: The buildings' design does not seem to have considered accessibility features for PWDs. This can mostly be attributed to the buildings being built at a time where accessible design wasn't a well-known concept in the country.

Q: Current plans for accessibility

A: The number of students with disabilities enrolled at the institution is very low. However, this does not mean accessible in an educational institution can be overlooked. Ramps have been provided at the entrance of architecture department, electronics departments and the ICTC building.

Q: Future plan to improve accessibility

A: The new aerospace department and graduate building that are in design phase shall be fully accessible with disability-friendly design feature for ease of mobility throughout the buildings. The institution has also collaborated with national level PWD organizations to conduct interaction programs with the civil, architecture and mechanical departments.
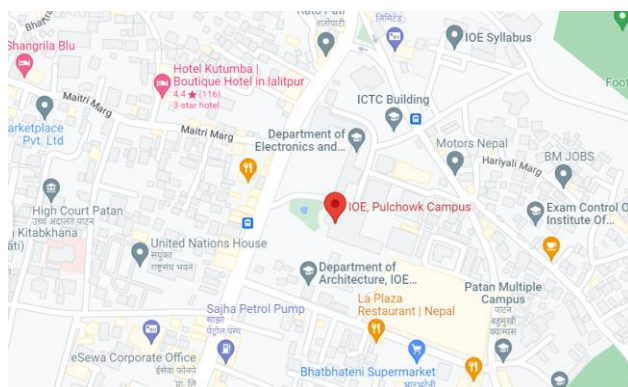
Figure 3-64 Location Map: Pulchowk Campus

3.4.9 Nepal Telecom Office, Jawalakhel

Name of Interviewee: Netra Bhujel

Post: Senior Officer

Q: Understanding about universal design

A: The interviewee had limited knowledge about PWD rights and Universal Design.

Q: Building compliance to universal design theory

The main customer service zone has not considered any sort of accessibility features for PWDs.

Q: Current plans for accessibility

A: The number of PWD visiting the facility is very low. All basic services have been accommodated at the ground floor for the convenience of visitors. There is no provision for wheelchair users to enter the building. PWDs are required to bring a carer to go into and around the building.

Q: Future plan to improve accessibility

A: There are no future plans, as of now, for the provision of accessibility in the building.

Figure 3-65 Location Map: NTC Office

Figure 3-66 Interview with the Officer

3.4.10 Lalitpur District Administration Office

Name of Interviewee: Hari Prasad Panta

Post: Assistant Chief District Officer

Q: Understanding about universal design

A: The interviewee had limited knowledge about PWD rights and Universal Design.
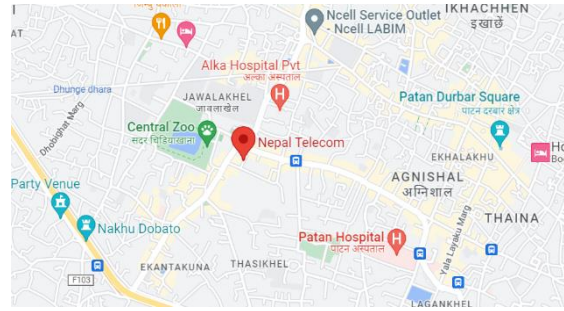
Q: Building compliance to universal design theory

The customer service building has not considered any sort of accessibility features for PWDs.

Q: Current plans for accessibility

A: The number of PWD visiting the facility is fairly low. Usually, 2 to 3 people with disability visit the facilities. All basic services have been accommodated at the ground floor for the convenience of visitors. There is provision of ramps for wheelchair users to enter the building. Visually incapable persons are required to bring a caregiver to navigate the buildings layout and services.

Q: Future plan to improve accessibility

A: There are no future plans, as of now, for the provision of accessibility in the building.

Figure 3-68 Interview with the Assistant Chief District Officer

**Figure 3-67 Location Map: Lalitpur District Administration Office**

3.5   Questionnaire Survey: Public Buildings

The survey is divided into four sections. To ascertain the user profile, the first five questions were asked. The next three questions evaluated accessibility, the next three examined utilization, and the final three investigated reasons for dissatisfaction. The respondents were questioned about any challenges they encountered while visiting the study area and whether they had any suggestions for how to make it more user-friendly.

All 50 survey participants were given the same questions to answer. Age, gender, occupation, type of impairment, and preferred mode of transportation were all elicited to create user profiles. In the assessment of accessibility, inquiries were made regarding users' satisfaction with the infrastructure's accessibility outside of the infrastructure as well as inside of it. Finally, inquiries were made regarding the use of public buildings in relation to the identified variables, such as their aesthetics, hygiene, upkeep, security and the diversity of amenities and activities offered. The annex contains the questionnaire form that was used.

Results

The questionnaire survey has been carried out with a total of 50 respondents which has been categorized into two groups including 25 visually impaired persons and 25 people with mobility impairments. All the respondents are residents of Lalitpur and are well acquainted with the Patan area and the majority of them travel to the site area for work every day. 50 persons in total, including 18 men and 32 women, were interviewed. According to the survey, user attributes like sexes, age, literacy level, or household composition have little bearing on consumers' choices for accessibility or how they use public places. Users of various ages and genders replied to the questions similarly in regards to their utilization o accessibility. Most of the participants were within the 30 to 60 age range.
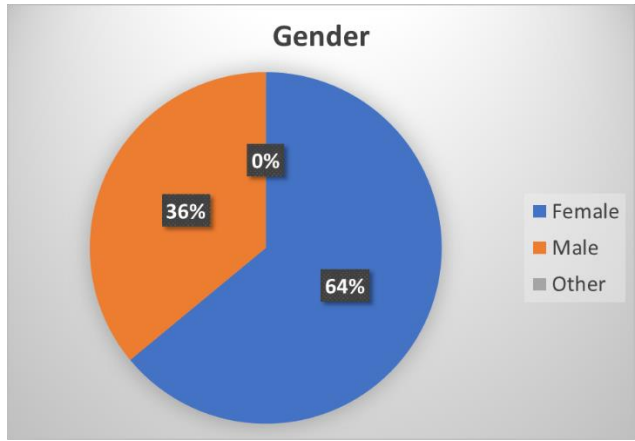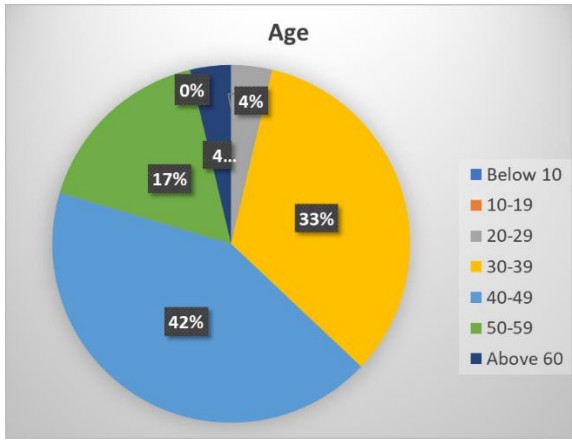
Type of Impairment
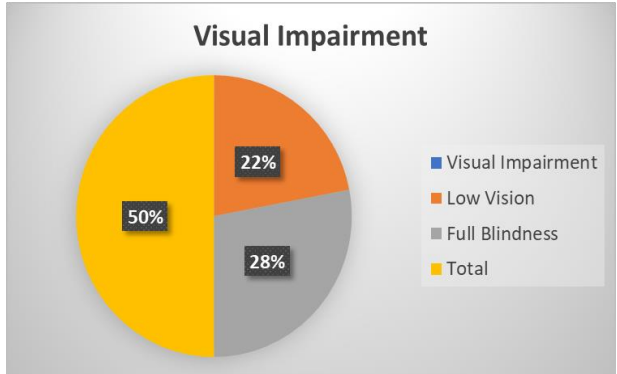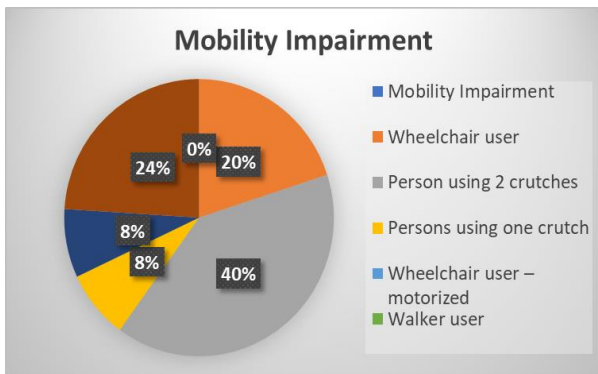
Mobility Impairment	Frequency	Percentage
Wheelchair user	5	10
Person using 2 crutches	10	20
Persons using one crutch	2	4
Wheelchair user – motorized	0	0
Walker user	0	0
Cane user	2	4
Difficulty in walking	6	12
Others	0	0
Total	25	50

Visual Impairment	Frequency	Percentage
Low Vision	11	22
Full Blindness	14	28
Total	25	50

Figure 3-69 User Profile

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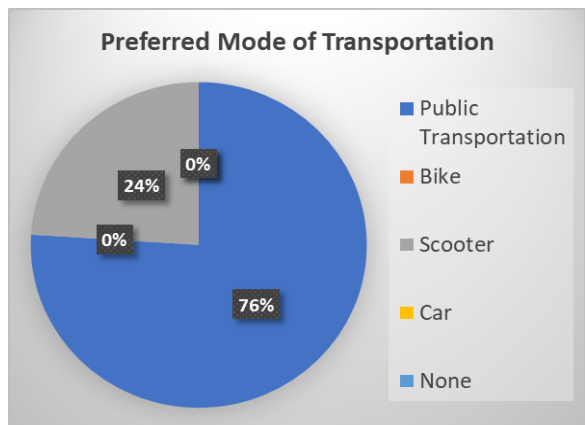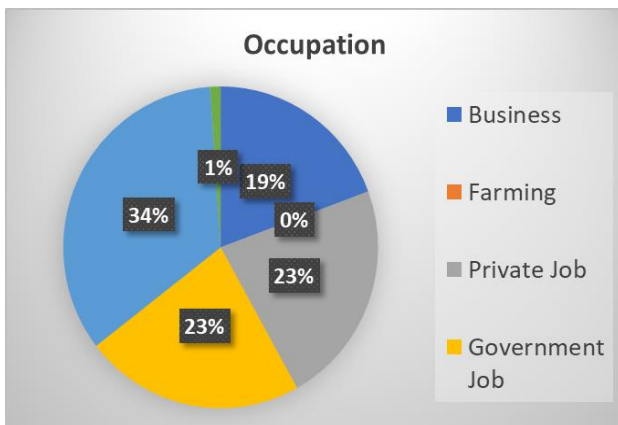
3.5.1   Labim Mall

Do you use the infrastructure?
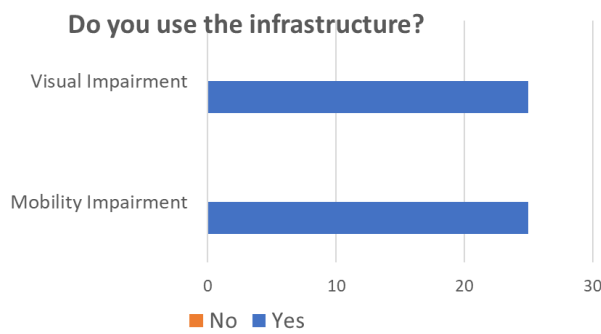
Firstly, In the assessment of accessibility of Labim Mall, the respondents were asked questions regarding use of the infrastructure, where all users responded positively. The respondents were categorized into two groups, namely, people with mobility impairments and people with visual impairment.

Assessment of Accessibility

Access to the infrastructure (physical structure)

Accessibility inside the infrastructure (quality and quantity)

Assessment of Utilization

Aesthetic Consideration (Maintenance and Cleanliness)

Comfort & Safety
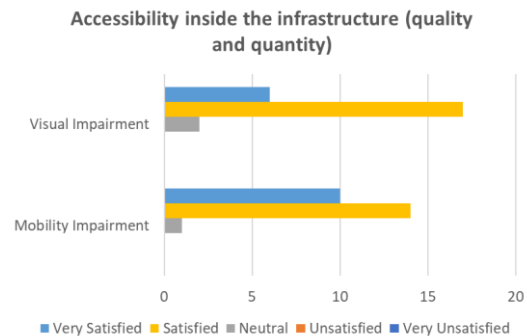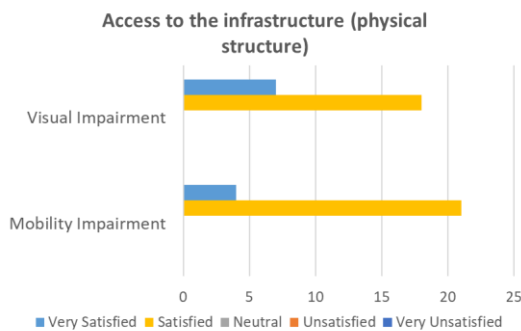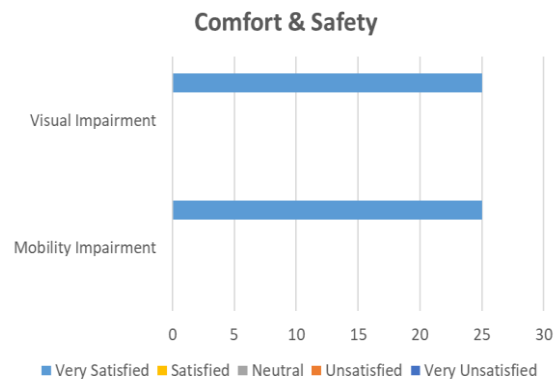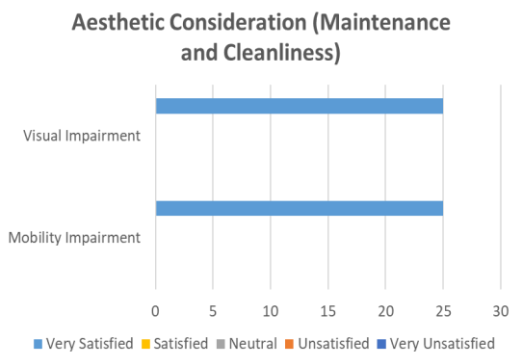
In terms of access to the infrastructure, both groups responded that they were satisfied or very satisfied with the infrastructure. Regarding maintenance and cleanliness, both groups gave wholly positive responses. When assessed in terms of comfort and safety, the widely held response was 'very satisfied'. The majority of respondents have said that they are satisfied with the variety of activities or facilities available.
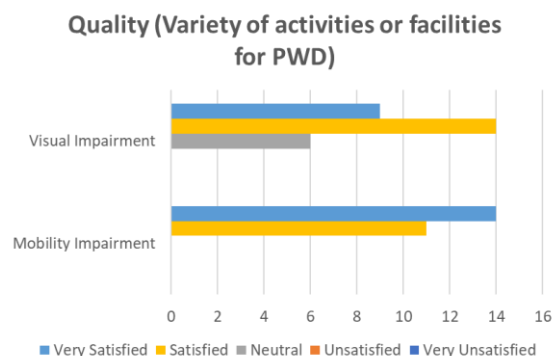
Quality (Variety of activities or facilities for PWD)

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3.5.2 Lalitpur Metropolitan City Office

Do you use the infrastructure?

No Yes

The same questions as previous were asked regarding the assessment of accessibility LMC Office. The majority of users were satisfied with the access to the infrastructure, whereas most were neutral or unsatisfied with accessibility conditions inside the building.
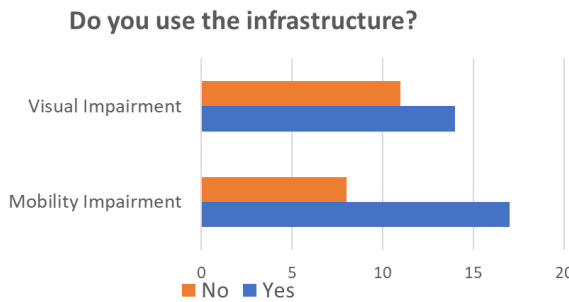
Yes- Meetings with authorities

No- Never had reason to visit the premises.

Assessment of Accessibility

Access to the infrastructure (physical structure)

Very Satisfied Satisfied Neutral Unsatisfied Very Unsatisfied

Accessibility inside the infrastructure (quality and quantity)

Very Satisfied Satisfied Neutral Unsatisfied Very Unsatisfied

Assessment of Utilization

Aesthetic Consideration (Maintenance and Cleanliness)

Very Satisfied Satisfied Neutral Unsatisfied Very Unsatisfied

Comfort & Safety

Very Satisfied Satisfied Neutral Unsatisfied Very Unsatisfied

Quality (Variety of activities or facilities for PWD)

Very Satisfied Satisfied Neutral Unsatisfied Very Unsatisfied

The majority of them replied that they were satisfied with the aesthetic consideration regarding maintenance and cleanliness as well as the comfort and safety at the infrastructure. However, the majority of mobility impaired respondents were neutral about the quality of facilities available for them.

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3.5.3 Patan Hospital

Do you use the infrastructure?

- No
- Yes

Assessment of Accessibility

Access to the infrastructure (physical structure)

- Very Satisfied
- Satisfied
- Neutral
- Unsatisfied
- Very Unsatisfied

Accessibility inside the infrastructure (quality and quantity)

- Very Satisfied
- Satisfied
- Neutral
- Unsatisfied
- Very Unsatisfied

Assessment of Utilization

Aesthetic Consideration (Maintenance and Cleanliness)

- Very Satisfied
- Satisfied
- Neutral
- Unsatisfied
- Very Unsatisfied

Comfort & Safety

- Very Satisfied
- Satisfied
- Neutral
- Unsatisfied
- Very Unsatisfied

Quality (Variety of activities or facilities for PWD)

- Very Satisfied
- Satisfied
- Neutral
- Unsatisfied
- Very Unsatisfied

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3.5.4 District Administration Office

Do you use the infrastructure?
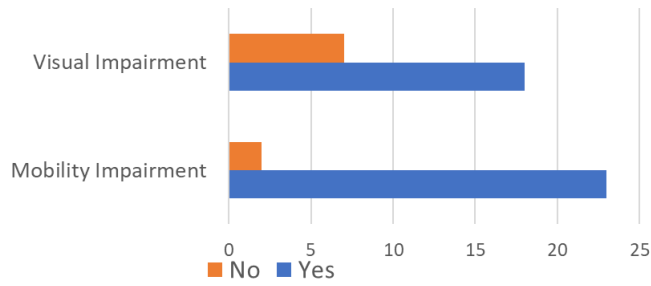
Assessment of Accessibility
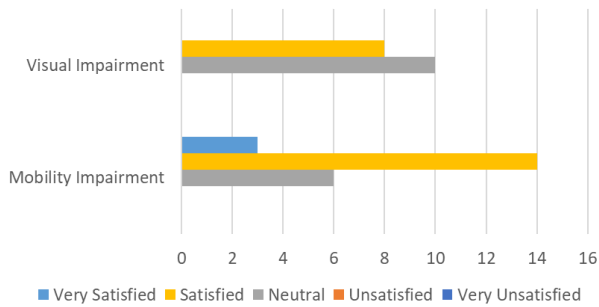
Access to the infrastructure (physical structure)

Accessibility inside the infrastructure (quality and quantity)
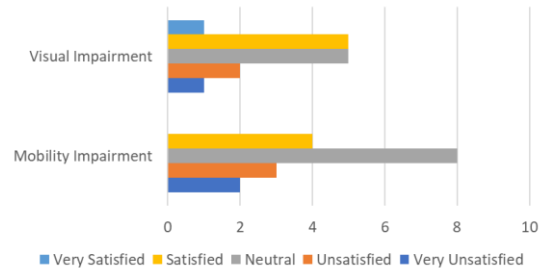
Assessment of Utilization

Aesthetic Consideration (Maintenance and Cleanliness)
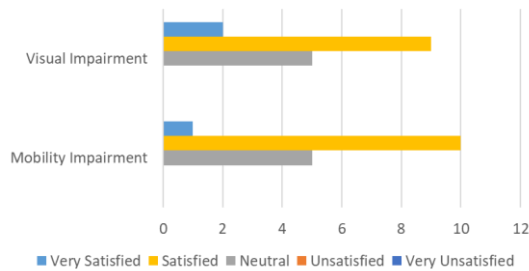
Comfort & Safety

Quality (Variety of activities or facilities for PWD)

165
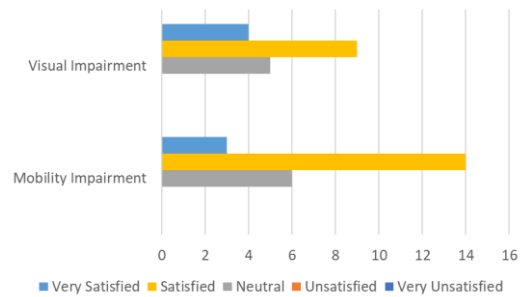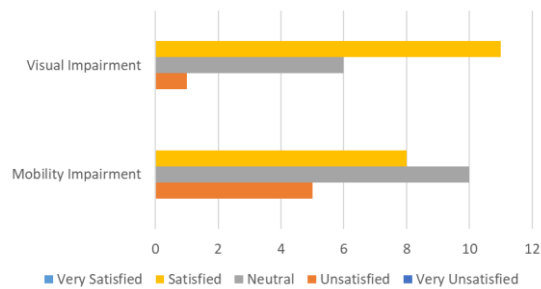
3.5.5 Nepal Bank, Gabahal

Do you use the infrastructure?

3.5.6 District Court

Do you use the infrastructure?

3.5.7 Land Revenue Office

Do you use the infrastructure?

3.5.8   Pulchowk Campus

Do you use the infrastructure?
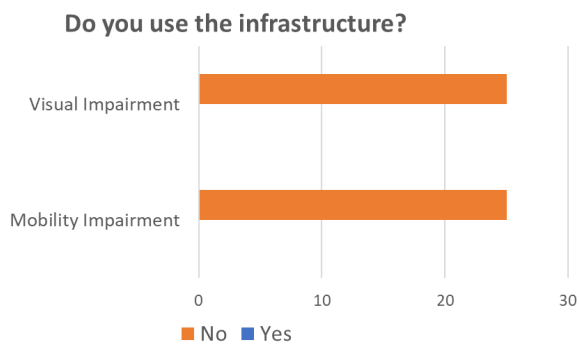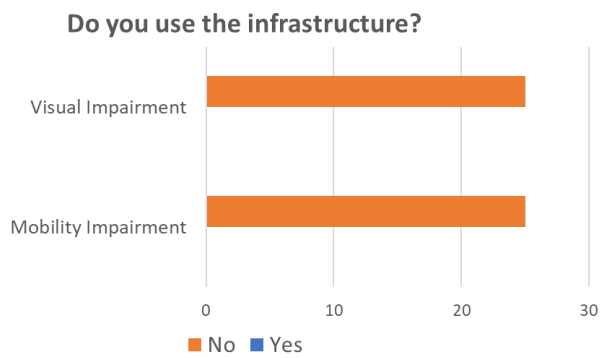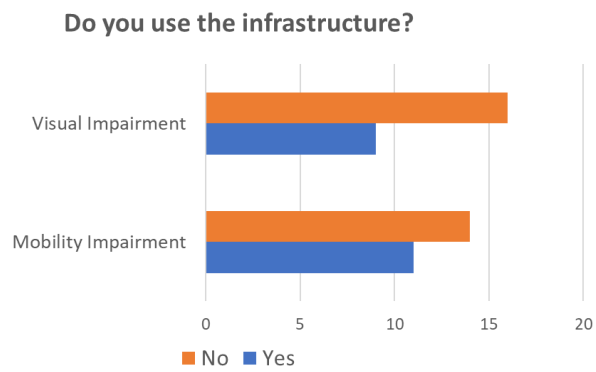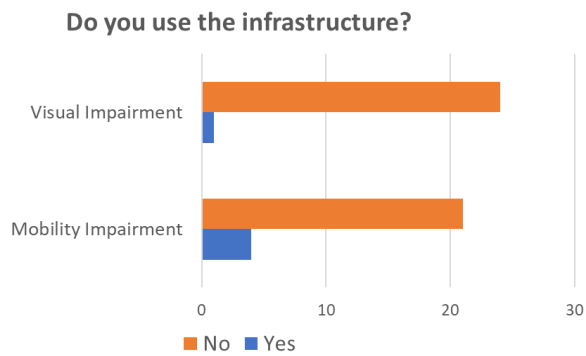
3.5.9   Namuna Machhhindra School

Do you use the infrastructure?

3.5.10 Nepal Telecom Office
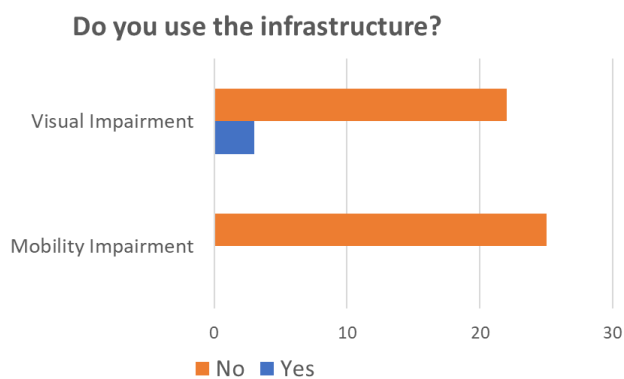
Do you use the infrastructure?
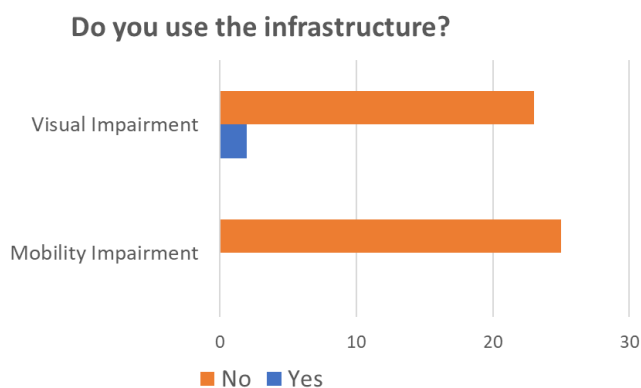
Regarding Nepal Bank, district court, land revenue office, Pulchowk campus, namuna Machhindra school and NTC Office, Never had to use the services, a vast majority of both mobility and visually impaired respondents replied that they didn't use the infrastructures mostly due to inaccessibility, never having to use the services or that they had someone else go in their place due to the lack of accessibility.

3.6   Questionnaire Survey: Architects' Perception of Accessibility in Built-Environment

This study was conducted in order to understand the priorities and knowledge of architects regarding the needs of disabled people because there are no records of architects' attitudes toward disabled people in Nepal. Initially, a questionnaire was developed and distributed to ascertain how architects felt about disabled individuals and their requirements in the built-environment.

Q: During your professional education, did you attend a course on the physical requirements of PwDs?
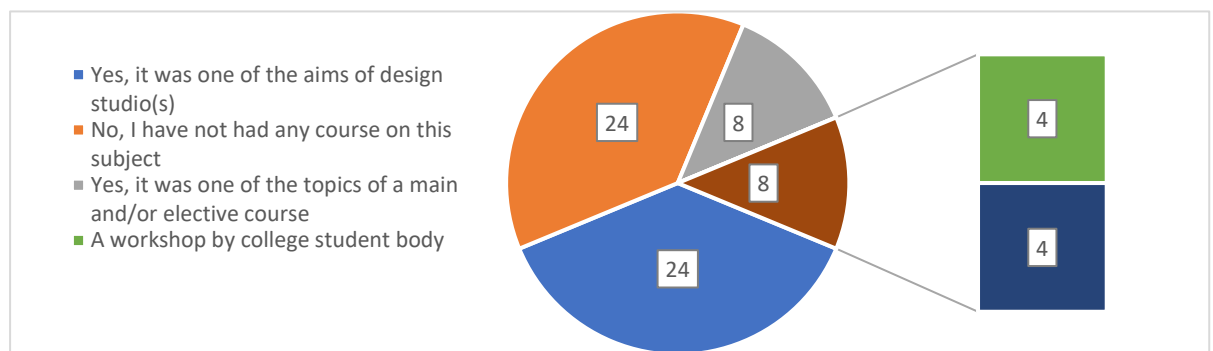
Q: How would you describe your experience as a professional architect in regards to designing for people with disabilities?
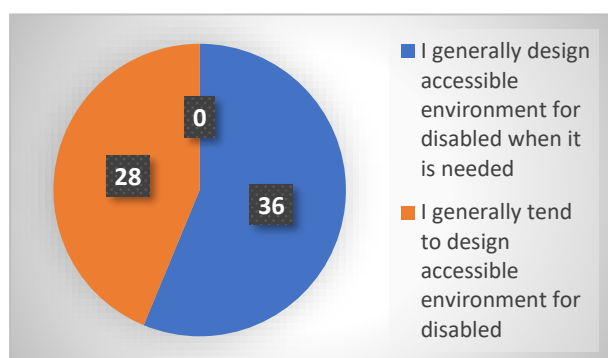
Q: What accessible design features do you commonly provide?
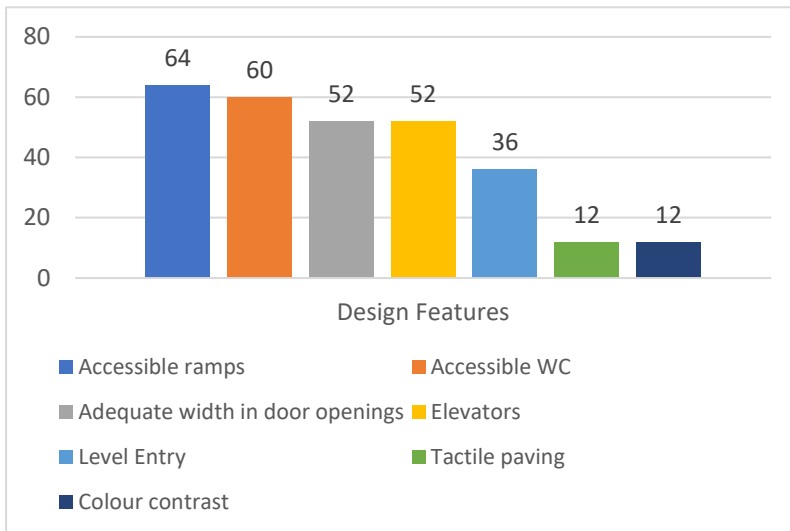
Q: What types of properties do you implement the concepts of accessibility to?
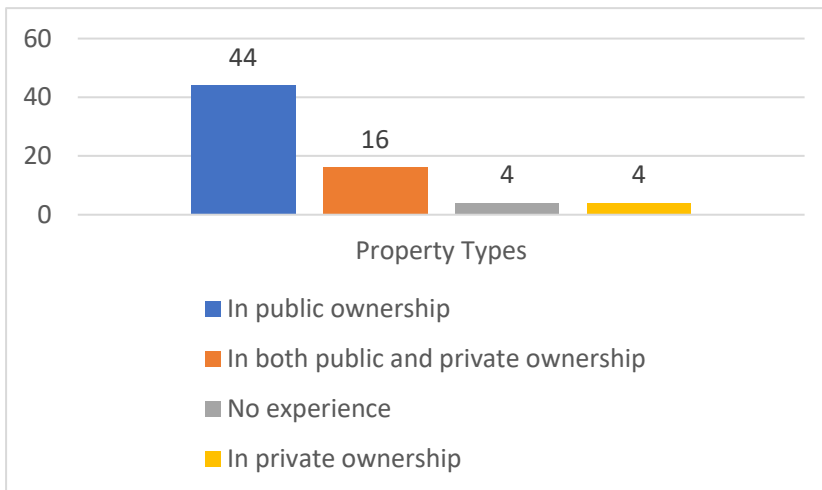
Q: What types of disabilities do you consider while designing a project?
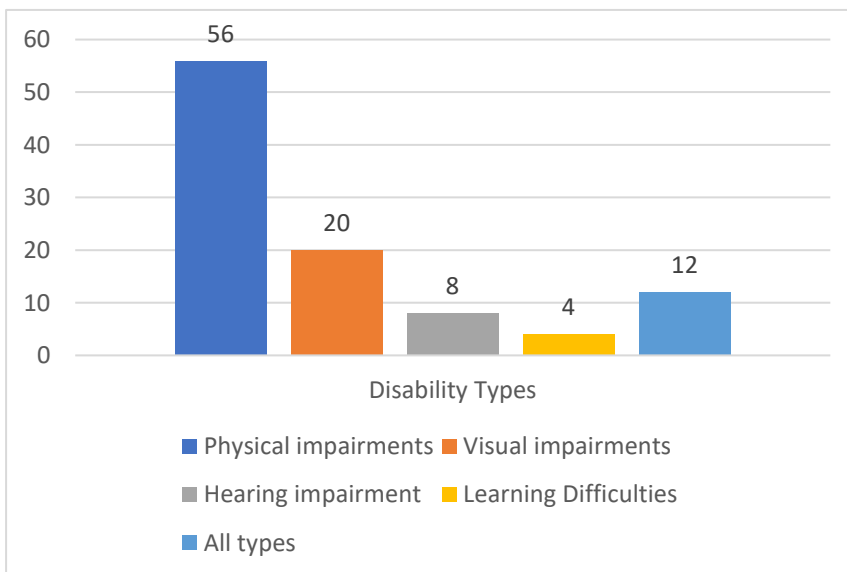
Q: Are you satisfied with the current practice of accessible design in Nepal? Please state your reasons.
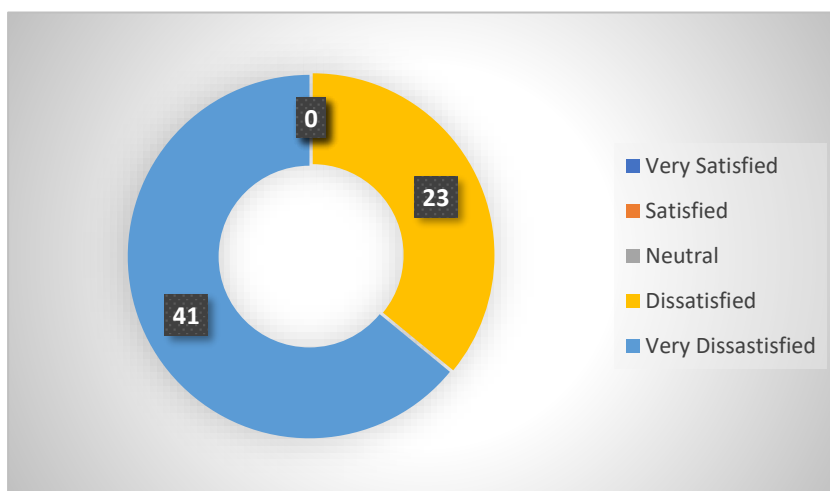
Following are some answers provided by the respondents.

"No. Because designs are not made disable-friendly as they should be. Whenever it comes to making any design disable friendly, only entry part is focused and accessibility to other floors is not considered."

"Not fully satisfied, but most public buildings now have ramps to accommodate those with physical disabilities."

"I do not really see there is any guidance or law for the requirement of accessible design. If someone has to use wheelchair in footpaths it is not suitable as there is no curb ramps at the edges of the footpath. Some of the shopping malls are on podium, take for example Civil mall where you have to take stair to enter into the mall. Where is accessibility in malls. Coming to other public places eg, banks, restaurants party Palace, these are just few examples where accessibility is 100% required. I have seen most of the banks on upper floor without provision of lift. Some party palaces are on roof top without provision of lift. Similarly, most of the restaurants are on the higher ground where wheel chair cannot be taken. I am in an opinion that all buildings where public are admitted for free or with some fee including public and private buildings must be accessible. Not to forget those almost 5 m high crossing bridges in Kahmandu. How will a disabled person be able to use these services??"

"Not really, there aren't enough monitoring systems. And even if we include accessible design, we only consider physical impairments."

"I'm absolutely not satisfied with the current practice for sure. I think one of the main reasons is our education system. We have a practice of designing and thinking about this topic at the end only. Awareness should be raised regarding disability-freindly design practices. Lack of research and study could be another reason."

"No. Even if it is designed in papers, practice is very poor."

"Accessible designs are not applied unless it is absolutely necessary."

"I am not completely satisfied with the current practice of accessible design in Nepal. Providing accessible design features does not always seem to be a priority due to reasons such as lack of awareness, cost reduction and area availability. in addition to this in Nepal, many public buildings are old and historic buildings that are being reused. Provision of accessible features in such buildings also has been a challenge."

"Absolutely not, clients need more spaces for other functions than that of the accessibility and circulations"

"No, the current practice in Nepal is only based on seeking the approval from Municipality and related authorities. I think designers should consider differently abled access with correct flow and should ensure ease of access to all parts of the building."

Results

In total, 6 questions were asked to the respondents. The survey was distributed to 64 architects. According to the data, only a small percentage of participants learnt about the necessities of handicapped persons in a special module or optional course during their occupational training, and they currently only provide accessible design for the physically impaired. Simply put, Nepal has made little to no progress toward accessibility for PwDs because of deficiencies in the education system that trains professional architects and a lack of implementation.

3.7 Interviews with Experts

This questionnaire is aimed at evaluating and collecting information and suggestions on the history, present condition, complications and future of universal design in the context of Nepal. Five experts who are actively working in the field of accessible design or the construction of public buildings in the Kathmandu valley were selected for in-depth interviews.

3.7.1 Prof. Deepak Pant

Faculty of Institute of Engineering

1.   How would you define inclusive and/or universal design?

A: A design that accommodates people of any age, abilities, and physical condition, including but not limited to those with mobility and vision deficits, the elderly, children, dwarfs, etc., is known as universal design. Basically, barrier-free design, which increases the usability of any space, is universal design. It necessitates a wholistic viewpoint and method for infrastructure development.

2.   What got you started and how has it kept you going up until today?

A: During the course of my studies, I found and area of dryness around the topic of accessibility in design. Most people go through stages of handicap at one time or other during their lifetime. We must develop understanding and compassion for those less physically or mentally able than us. This has been a self-learning process to me.

3.   What is the condition of accessible design in Nepal? How much progress has the country made in terms of accessibility in the past years?

A: The advent of accessible design has happened in bits and pieces over the years, in the case of Nepal. People lack holistic thinking and perceive accessibility as a mere requirement to be fulfilled. Still, in many public buildings and spaces we can see that even the bare minimum of mandatory accessibility features has been completely overlooked. This results in the exclusion of PWD from essential socioeconomic activities. In many cases, even the limited knowledge that people have obtained are found to be outdated and not up to standards. Progress is slow and independent mobility for PWD is still a pipe dream.

4.   How has your approach to accessibility changed over time?

A: regularly keeping up with updates in internationally acclaimed accessibility standards has helped in refining my understanding and knowledge of barrier-free design and its elements.

5.   What are the limitations for accessible design in Nepal?

A: One of the many problems faced by accessibility in Nepal, is the mindset of the people. Byelaws, codes and regulations are confined to paper and documents, as mere obligations but not implemented due to lack of awareness on an individual level. The cost of specially designed elements that can be used by both able-bodied people and PWD would be more or less the same but the people still opt for traditional design. Someone once said, the advancement of any society can be determined by observing how it treats its PWD population. In a sense it can be said that Nepal hesitates to embrace change and a progressive mindset, preventing us from developing alongside the world, which also has similar negative impacts on many other aspects of the community.

The lack of awareness in people can also be attributed to inadequate lobbying and lack of influence on the public or government bodies on the part of PWD organizations.

6.   What challenges have you faced while designing and implementing accessible design and how did you overcome them?

A: The concept of accessible design has yet to appeal to the Nepalese people. Clients are usually hesitant on spending space and expense to incorporate accessible deign into their buildings. It requires demonstration of proofs of financial incentives to convince clients to get on board with the idea of accessible design. Although several campaigns have been deployed to raise awareness on this subject, it does not guarantee implementation. Hence, accessibility guidelines are limited to codes and regulations.

7.   Do you think the current curriculum is adequately teaching students about the importance of accessible design?

A: In my opinion, the current curriculum fails to encompass all the basic components of accessibility in design. The feeling of responsibility towards creating truly barrier-free built environments must come from be realized by students on an individual level.

Mandatory courses are required to impose is essence on future architects and engineers. More trainings, refresher courses, etc could motivate students to give more thought to accessibility in their designs.

8.   How can someone unfamiliar with the concept of accessible design learn and stay up-to-date with changing trends and techniques?

A: Setting some extraordinarily commendable examples of barrier-free buildings and open spaces will support the promotion of PWD rights and increase its familiarity within the masses. The current building code needs to revise its section on minimum accessibility. Internationally acclaimed accessibility standards can be referred to improve and expand the scope of accessible design. Universal design certificates and tax incentives could be granted to particularly admirable efforts. Similarly, buildings that fail to incorporate accessibility into their design need to be penalized by authorities. It is critical that all principal stakeholders are well-educated on the subject of accessibility and PWD rights. A design of great quality should be able to convince any client to give positive feedback on incorporating accessible design elements. Said elements must not seem like a waste of expenses and space but must look like an essential component of the design which is practical and could be used by everyone.

9.   What do you see in the future for inclusive design?

A: Honestly speaking, the status of inclusive design in Nepal doesn't seem to be advancing in a satisfactory rate. We are ages overdue in providing even the most basic of amenities to the PWD, which indicates the how far behind we are on development as a community. It is not guaranteed that a person should remain able-bodied all their life. People need to realize that disability does not mean someone cannot be a vital contributing member of the society. Discrimination and selfishness should never be tolerated. It is high time that we transition into a community who gives equal respect and rights to all regardless of their physical or mental capabilities.

3.7.2   Er. Ananta Baidya

Former faculty of Institute of Engineering

Civil engineer based in California, USA.

1.   How would you define inclusive and/or universal design?

A: The concept of accessibility is related to human rights, dignity, equality and providing the right environment to everybody irrespective of their ability. In my concept, people have the wrong notion about what accessibility is.

2.   What got you started and how has it kept you going up until today?

A: When I was a civil engineer in Nepal or even when I was a practicing engineer in the US, I used to have no idea about the concept of accessibility. Then I eventually worked for a municipality in the US, where I granted permits for houses and infrastructures and had to enforce accessibility laws to make sure structures and infrastructures were made to be inclusive. That is where I first learned about accessible design.

People have the wrong notion about what accessibility is. As a parent of a disabled child myself, I feel the responsibility to make all who are working in the field of accessibility understand the need of accessibility. it is not for the reasons of pity or empathy but rather, making somebody's life better and giving them more independence than they've ever had, as architects, engineer and young people with a passion for these themes.

In Nepal's context, a disabled person is dependent on someone else to move around at all time. The built environment must inspire confidence about oneself so that you do not require to rely on someone else. PWD themselves do not realize that only if some simple design

Figure 3-70 Virtual Interview with Er. Baidya

changes are made, they would be able to move around by themselves.

This then brings up the problem of the infrastructures not complying to regulations. The codes have mentioned the requirement of ramps in buildings but has failed to provide instructions on how to build them.

All over Nepal, especially in the Kathmandu Valley, we will find ramps that do not comply to standards. The problem is with the mindset of people. If the need to negotiate the ramp isn't realized, then no one is going to question the ramp.

The Nepalese government has spent 70 million dollars on sidewalk access alone. And even now expenses are being made in Kathmandu valley. The problem with it is that the safety in these streets isn't very well thought of. The soil beneath the sidewalk is not compacted adequately in many cases. The tactile strips on the middle of the sidewalks also pose a threat to high heel users and many others. These strips are also in a way, confining blind people to the strip which could be seen as a form of discrimination. The design must think about the safety and rights of every user. An alternative could be, providing tactile markers at transition points such as turnings, slops, stops and obstructions.

3.   What is the condition of accessible design in Nepal? How much progress has the country made in terms of accessibility in the past years?

A: In Nepal, PWDs are still looked at as people with problems, as people who need help for most things. In reality, most don't need help. They could manage by themselves if only the right infrastructures were created.

Disability is looked at from a very different perspective, that of pity. The attitude prevails over the population, without the realization that there is tremendous potential in PWD if only we create the right environment for all. These are the philosophical things that we might want to begin with while discussing accessibility in design.

4. What are the limitations for accessible design in Nepal?

A: Nepal is home to many historic sites such as the Patan durbar square, which cannot be accessed in a wheelchair. Since it is a sites of heritage value, the components of the built environment must not be altered in any way. In such cases, the principal to be followed is, PWD have to have access through equal points as far as possible, where possible. Because of certain constraints, it is required to think of alternate ways in which safe passage can be provided to PWDs. Alternative access instead of no access at all can be considered a viable option in situations such as this. In a heritage site, this wouldn't be categorized as discrimination as opposed to a movie theatre for example, where alterations in design could be made to provide equal access to the disabled and able alike. The idea of equivalent facilitation states that we do not have to provide the same facility but an alternative that meets the intent shall suffice in special cases.

5. What challenges have you faced while designing and implementing accessible design and how did you overcome them?

A: I have presented at different institutions as a guest lecturer. I have also collaborated with PWD associations in awareness and accessible design campaigns. My first project relating to accessible design was a public bathroom. KMC is talking about installing public bathrooms in the city, but no one is talking about making these bathrooms accessible. The human rights of PWDs have once again been overlooked. Accessible public bathrooms could change the whole ambience of Kathmandu if done correctly.

The ramps and bathrooms of the Ministry of Women, Children & Social Welfare itself are not compliant.

The PWD associations know very well what their right are but do not know how to demand for, negotiate and acquire those rights. Slow improvements have been coming along but it is not adequate. These associations are focus to a great extent on funding and financial incentives.

6. Do you think the current curriculum is adequately teaching students about the importance of accessible design?

A: I do not think the curriculum encompasses the essence of accessibility at all. You people as architects have to spend some time talking about the fundamentals of accessible design. Not everything can be taught in the classroom though. But the question has to be raised at the education level. Architects are inherently responsible

for compliance of accessibility standards in building design. Likewise, engineers are responsible for the ensure of safety in structures. Discussions about this subject must be stimulated in order to generate interest in the minds of the younger generation so that they pick it up and move forward with the knowledge provided to them. Nepal has now become too much of a 'me'-society, steeped into corruption and greed for money. All other things become secondary. Until Nepal becomes an 'us'-society again, we are not going to get anywhere.

Talking about IOE, if the management becomes an 'us' management, and realize the need to make sure that PWD students can attend any class, an initiative can be taken instead of creating an excuse that the rate of disables students enrolled at the institution in low. The point is that we start with one person.

7.   How can someone unfamiliar with the concept of accessible design learn and stay up-to-date with changing trends and techniques?

A: First of all, you would need to have interest in the subject. You need to understand what this is all about and think outside the box. It is not about you; it is about the society and the people that you serve through your skills and expertise. You as an architect have the power to be a part of a greater transition in the society. If the mindset of the people doesn't align with the concept, the education and all the course taken would bear no results.

8.   What do you see in the future for inclusive design?

A: To be completely honest, I do not see a bright future. If the society, the education, administrative and financial system doesn't change from a 'me' society to 'us' society, there is really no hope for any improvement in present conditions. There is also the issue of public awareness and eagerness. Architects and engineers need to take a stand for safe, secure, accessible, fire and earthquake resistant design and construction. We must approach the topic in the right way- which is understanding the fundamentals i.e., safety, appropriateness, functionality, geometry, dimension, equivalency and equitability rather than the nitty gritty details.

3.7.3 Mr. Kiran Shilpakar

Chairperson at NAPD-Nepal (: Voice of Our Own- Barrier Free Society for All)

1.   As an experienced person in the field of PwD rights, how would you define accessible design?

A: Accessible design should be a design that can be accessed by every single person including but not limited to, people with visual, physical or mental disabilities.

2.   What kind of work does the organization do?

A: The NAPD-Nepal is a self-driven, non-profit, and non-political organization. It is associated with the Social Welfare Council and was registered in 1997 under the Country Act at the District Administration Office in Kathmandu. It belongs to the Human Rights Treaty Monitoring Coordination Committee, the Women Security Pressure Group, and the National Federation of the Disabled-Nepal (NFD-N) (HRTMCC). The mission of NAPD-Nepal is to fully develop Nepal's physically challenged population by utilizing all available possibilities and assets (NAPD-Nepal, n.d.).

Since a decade ago, NAPD-Nepal has successfully carried out a number of initiatives for the advancement of PwPDs. It has been aggressively promoting and ensuring PwPDs' rights in a variety of developmental sectors. Its main operations include promoting understanding, advocating for change, lobbying, collaborating, delivering skill-based workshops, capacity - building, conducting studies and research to examine the challenges related to impairments, and developing expertise. Additionally, it has also been operating in Nepal as a partner network organization of Oxfam International's "We Can" program to stop all forms of violence against women (NAPD-Nepal, n.d.).

3.   What problems do PwD encounter in public buildings and spaces?

A: As a person with physical disability myself, I find the condition of infrastructures very inadequate and unsatisfactory. Using public spaces is a matter of challenge for us due to lack of ramps, handrails, elevators or bathrooms. The attitude of people towards PwD has also been an issue.

4.   What do you think is the cause behind these reasons?

A: There is this misconception that providing accessibility features in a structure will increase the construction expenses exponentially. This is an absolute myth. In fact, we have studied this matter and it was found that ramps

Figure 3-71 Interview with the Chairperson

could actually cost less than stairs if done in the right way. Speaking of accessible toilets, it would not incur much increase in cost to just provide accessible fixtures and slightly larger spaces for safety and functionality. The traditional method of using stairs for entrances should be swapped for adequately designed ramps which can be accessed by all.

5.   Does the government allocate budget for PwD rights and accessible design specifically?

A: Yes, the government does allocate a certain amount of budget for PwD but it is not much. There is no budget allocated specifically for accessible design.

6.   What can be done to improve accessibility?

A: Bringing about awareness in the people about PwD rights and the importance of accessibility in buildings, especially public spaces is vital.

7.   What guidelines should be followed while designing for accessibility?

A: We are currently working on publishing a detailed accessible design guidelines which will compound the information available in the National Building Code. The American Disability Act (ADA), guidelines from Japan, South Korea, Denmark, Norway and Sweden should be referred to acquire advanced knowledge about truly barrier-free design.

3.7.4 Ms. Tika Dahal

President of Nepal Disabled Women Association (NDWA) : Advancing The Rights Of Women With Disabilities In Nepal Since 1998

1.   As an experienced person in the field of PwD rights, how would you define accessible design?

A: It must be a design that caters to all and is safe and easy to use.

2.   What kind of work does the organization do?

A: In order to assist Women with Disabilities (WWDs) in pursuing their liberties and in providing them with security and monetary assistance, the Nepal Disabled Women Association (NDWA) was founded in 2054 (1998). It was founded on the principles of the foundational entitlements and obligations guaranteed by Nepal's legislature. The lives of PwDs from all facets of the Nepalese society would not be happy and productive until they comprehend and practice their civil rights, especially those guaranteed by the United Nations Convention on the Rights of PwDs (NDWA, n.d.). Therefore, NDWA supports the program to increase the ability of the women with disabilities living in both urban and distant regions of the nation to make them competent as well as emboldened so that they are able to utilize their rights. It is crucial to strengthen women from other underprivileged groups, such as disabled Dalit and Madhesi women, to increase their self-worth and self-assurance. In this respect, NDWA has a significant advocacy duty to fulfill regarding WWD-related problems, including the prerogatives to welfare benefits, work, medical services, and schooling. To fulfill its objective, NDWA aims to establish and direct a national system of self-help organizations for women with disabilities.(NDWA, n.d.),

3.   What problems do PwD encounter in public buildings and spaces?

A: People with disability and especially women with disability come across a range of problems in the public. Even performing basic daily activities and performing errands independently is a difficult task for these people. The design of public spaces should have enabled them to move about independently and perform tasks with ease.

4.   What do you think is the cause behind these reasons?

A: Violation and complete ignorance of building guidelines regarding accessibility is a key problem. Even if accessibility features are provided, they are not compliant to guidelines in many cases, which limits the independent mobility of PwD. Another reason is the refusal of people to consider to consider the rights of PwDs.

Figure 3-72 Interview with Ms. Dahal

5.   Does the government allocate budget for PwD rights and accessible design specifically?

A: Budget is assigned at the central, federal, regional and local levels, although there has not been a budget assigned explicitly for accessibility in design of buildings.

6.   What can be done to improve accessibility?

A: Proper education of architects and engineers is crucial for the improvement of accessibility conditions. The beginning of debates and addition of courses could be a solution for these problems. The existing policies regarding accessible design must be improved and implemented in all sectors. Annual planning, budgeting and mobilization of human resources must be looked into. Monitoring and investigation of the implemented works can be done through regular access audits. Above all, the mentality of the public must be changed. WwD should be perceived as not only users but vital contributors to society and its economy.

7.   What guidelines should be followed while designing for accessibility?

A: The existing codes available in the NBC must be strictly implemented. International guidelines can be looked into for further improvements in the code.

3.7.5   Er. Indra Bahadur Shrestha

1.   How would you define accessible design?

A: It is a design strategy that considers the requirements of persons with disabilities.

2.   What got you started and how has it kept you going up until today?

A: I gained experience on the topic of accessibility mostly from involvement in various large-scale public buildings. Through research I have been able to understand the importance of making structures accessible to all users.

3.   What is the condition of accessible design in Nepal? How much progress has the country made in terms of accessibility in the past years?

A: Accessible design is still not a popular topic in the Nepalese community. People know very little about it and many clients need quite a bit of convincing before they agree to incorporate accessible elements instead of traditional inaccessible design.

4.   How has your approach to accessibility changed over time?

A: With the emergence of new accessibility and safety features in design, we need to keep ourselves up-to-date with changing standards. Although it will take Nepal a while to get to the point of development that the global community is currently in, it is a good idea to gather as much knowledge as possible.

5.   What are the limitations for accessible design in Nepal?

A: As an engineer who mostly designs public government buildings, what I have found is that, authorities are not educated on the topic of accessibility. Everyone wants their buildings to display grandeur and splendor and have modern amenities built into it. But no one seems to give a lot of attention to how accessible their building is.

6.   Do you think the current curriculum is adequately teaching students about the importance of accessible design?

A: Improvements could be made in the education of young architects and engineers to encourage the use of accessible design in all their works.

7.   How can someone unfamiliar with the concept of accessible design learn and stay up-to-date with changing trends and techniques?

A: Keeping up with internationally acclaimed accessible designs should give us an idea of how a space could be made fully accessible through design.

8.   What do you see in the future for inclusive design?

A: The perception of people that accessibility features are unnecessary additional expenses and a waste of time, labour, space and finances should change. Ease of access and mobility for everyone should be a vital requirement of any public building design.
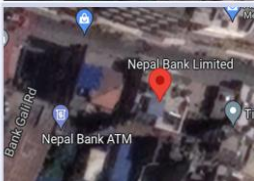
CHAPTER 4.   DISCUSSION

The descriptive analysis of the data demonstrates the extent to which accessibility has been applied and utilized by PwDs. Three main barriers are essentially identified for PWDs' exclusion from mainstream society in the context of Patan based on the literature, access audit of public open spaces and public buildings, experiences of PWDs, surveys with architects and interviews with experts and building managers. The first is an inaccessible physical environment that ignores the space needs of PWDs; the second is attitude issues and a lack of consideration for disabled people on the part of both the general public and professional agencies; and the third is a lack deficiencies in policies and guidelines for universal design solutions. In order to guarantee the inclusion of PwDs in our society and to uphold our commitment to the UN that "Everyone has the right of equal access to public service in his country," it is imperative that we address all of these issues and find solutions to the issues of physical and social exclusion of disabled people in the built environment.

4.1   Key Research Findings: Access Audits

i.Comfort and suitability factor of accessibility to public open spaces and buildings is mostly insufficient for people with visual and mobility impairments.

ii.Satisfactory rate of compliance is only apparent in new establishments.

iii.Patan's public spaces and buildings lack the necessary amenities and accessibility for PwDs to feel comfortable.

Table 13 Location details of sampling areas: Public Buildings

Name Location in City	Functions of the infrastructure	Present condition	Problems faced by PWDs	Plan/Aerial Map
District Court, Lagankhel	• Government establishment	• Inaccessible entrance • No designated parking space • Inaccessible toilets • Upper floors not accessible • No signs and markers for the visually impaired	• Inaccessible entrance • Court rooms at the first floor not accessible. • Inaccessible toilets	
Land Revenue Office, Lagankhel	• Government establishment	• Crowding • Inaccessible entrance • No designated parking space • Inaccessible toilets • Upper floors not accessible • No signs and markers for the visually impaired	• Office rooms at the first floor not accessible. • Shaded waiting area not accessible • Inaccessible toilets	
Nepal Bank, Gabahal	• Financial Establishment	• Inaccessible entrance • No designated parking space • Inaccessible toilets • Upper floors not accessible • No signs and markers for the visually impaired	• Inaccessible entrance • Office rooms at the first floor not accessible. • Inaccessible toilets	
Lalitpur Metropolitan City Office, Pulchowk	• Government establishment	• Inaccessible toilets • No signs and markers for the visually impaired	• Inaccessible park • Changes in levels at several places • Elevator frequently out of order	
Namuna Machhindra School, Lagankhel	• Educational Institution	• Accessibility features for visually impaired and wheelchair users.	• Upper floors not accessible via wheelchair • No emergency exits.	
Patan Hospital, Lagankhel	• Healthcare institution	• No designated parking space • Only one ramp available for the whole hospital. • Provision of elevators and handrails in corridors.	• Crowding • Inaccessible toilets at the emergency and general wards • No signs and markers for the visually impaired	
Labim Mall, Pulchowk	• Commercial complex	• Designated parking spaces • Accessible toilets • No signs and markers for the visually impaired • Provision of elevator, escalators and ramps.	• Ramps at the entrance are locked. • Inability to shop independently	
Pulchowk Engineering Campus	• Educational Institution	• No accessibility features for visually impaired and wheelchair users. • Inaccessible toilets • No signs and markers for the visually impaired	• Inaccessible entrance in most blocks • Upper floors not accessible via wheelchair • No emergency exits.	
Nepal Telecom Office, Jawalakhel	• Government • institution	• No designated parking space • Inaccessible toilets • No signs and markers for the visually impaired	• Inaccessible entrance • Inaccessible toilets • Office rooms in upper floors inaccessible	

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Name Location in City	Functions of the infrastructure	Present condition	Problems faced by PWDs	Plan/Aerial Map
Labim Mall, Pulchowk	• Commercial complex	• Designated parking spaces • Accessible toilets • No signs and markers for the visually impaired • Provision of elevator, escalators and ramps.	• Ramps at the entrance are locked. • Inability to shop independently	
Pulchowk Engineering Campus	• Educational Institution	• No accessibility features for visually impaired and wheelchair users. • Inaccessible toilets • No signs and markers for the visually impaired	• Inaccessible entrance in most blocks • Upper floors not accessible via wheelchair • No emergency exits.	
Nepal Telecom Office, Jawalakhel	• Government • institution	• No designated parking space • Inaccessible toilets • No signs and markers for the visually impaired	• Inaccessible entrance • Inaccessible toilets • Office rooms in upper floors inaccessible	

Table 6 Location details of sampling areas: Open Spaces

Name Location in City	Problems faced by PWDs	Functions surrounding the POS	Present condition	Plan/Aerial Map
Patan Durbar Square, Mangalbazar (Old City Core)	• Obstruction and Signage • Access to street furniture • Pathways • Ramps, Curbs, Crosswalks • Parking • Vendors	• Shopping • Stops (Microbus, Minibus, Tempos) • Institutions • Leisure • Service (cafes) • Major Street Junction	• Crowding • Traffic Congestion • Vitality • No foothpath	
Langankhel Park	• Obstruction and Signage • Access to street furniture • Pathways • Ramps, Curbs, Crosswalks • Parking • Public Toilet • Vendors	• Shopping • Stops (Microbus, Minibus, Tempos) • Institutions • Leisure • Service (cafes) • Major Street Junction	• Crowding • Traffic Congestion • Vitality (daytime) • Foothpath not continuous	
Jawalakhel Park	• Signage • Ramp for platform • Public Toilet	• Shopping • Stops (Microbus, Minibus, Tempos) • Institutions • Leisure • Service (cafes) • Major Street Junction	• No signs and markers for the visually impaired inside the park	

4.2 Main Problems Faced by PWDs in Public Open Spaces

There are some similarities between the questionnaire and the field study results. The majority of the compliant items, based on field observations, are related to wheelchair users. The available guide strips are insufficient. They incorporate negligible percentage of tactile paving and color contrasts into their design. Additionally, there weren't enough accommodations for blind people, which may have been due to the designers' ignorance of these different kinds of disabilities. This might be due to a lack of prohibition and enforcement during the monitoring process.

One of several issues in the city is parking. The city's most popular mode of transportation is driving, which results in heavy traffic congestion on a daily basis as a result of people using their motorcycles and cars. Unexpectedly few parking spots or accessible parking bays are designated for PwDs in public settings.

Due to their liability for all urban open environment designs under national acts, the duty of providing accessible surroundings falls to municipal government. Another important consideration is the percentage of professionals (engineers, designers, builders, architects, etc.) in the municipal authorities who have undergone training in disability awareness.

People with disabilities have difficulties using pedestrian roads that do not meet the standards and have unsuitable surface textures. For those with disabilities, transition issues brought on by incorrect infrastructure element placement and a lack of ramp arrangements can be extremely problematic. Disorganized and rough paving, as well as infrastructure components that do not meet standards, are problematic for those with disabilities.

4.3   PwDs' Satisfaction with Buildings' Accessibility

Participants in the survey were free to provide feedback at any time regarding the design of any facility they reviewed. The majority of the time, participants made comments about how poorly or incorrectly the facilities were designed and offered suggestions for improvements. Their feedback also included compliments for the facilities' positive attributes.

The participant who is visually impaired placed special emphasis on the building's signage, tactile directions or warning signs, and guiding block designs. This is crucial because these are the tools that enable a visually impaired person to move independently from one place to another. Signage is important because it directs visitors to a specific location and provides information about the name and purpose of various facilities. According to the participant who is visually impaired, effective signage should have large font sizes, effective color contrast between the background and the font, familiar and standard symbols, raised fonts, and Braille.

The participant who was confined to a wheelchair focused on the PWD restroom's large doors, furniture arrangement, ramps and high gradients or level changes. The person using crutches concentrated on the obstructions in front of the bathroom sinks and the slick floor surface. With the exception of the wheelchair-bound participant's focus on the door's size and the steep gradient, and the crutch-using participant's focus on the floor's material, the feedback from both groups is essentially similar. The factors they emphasized are also the factors which are essential for all citizens including able and disabled persons to conveniently utilize public facilities. A safer environment could be ensured by facilities with a lower gradient, non-slip flooring, a wider door opening without avoidable barriers.

4.4   The Perspectives of Building Managers and Authorities on Accessibility

Most people were aware of the significance of accessible design regarding accessible design. The interview subjects' mentioned accessibility plans line up with the facilities listed in the access audit. However, a few officers at some of the older buildings seem to think that providing services to PwDs outside the doorsteps of the building is enough

of an attempt to facilitate PwDs. One of the key components of the interview questions is regarding future plans to increase the building's accessibility. Such cases must be looked into because they could impact accessibility or provide a chance for it to happen.. Due to variations in building condition, design, and function, each building's future plan is unique. For instance, buildings with full accessibility are planned for the Pulchowk Engineering Campus, Patan Hospital, and Lalitpur Metropolitan City Office complexes.

Most interviewees demonstrate that they are aware of the universal design theory and that they do understand a significant portion of its principles. The interviewees also provide pertinent examples of how universal design is used in the buildings. Some building managers have voiced their displeasure with the absence of accessibility features in their institutions, while others have little understanding of the needs of those with disabilities.

4.5   Architects' Perception of Accessibility in Built-Environment

The study suggests that the problem is with people's awareness levels, education, and implementation. The study makes the recommendation that education of designers, who play a crucial role in creating an accessible built environment, such as architects, planners, interior architects, etc., be immediately improved. Innovative curriculum should be introduced to every professional education course, including those for landscape design, architecture, urban design and industrial product design. Design studios may incorporate inclusive and accessible design principles. Accessibility for individuals with disabilities shouldn't be viewed by planners and designers as imposing limitations on building design, but rather as rather as an important interoceptive tendency towards morality. Specialized professions like architecture, urban design and planning are required to meet the needs of every citizen. As a result, during both their educational and training phases, designers must receive proper training regarding the requirements of PwDs, including the idea of inclusive design.

The creation of an accessible environment is, of course, not solely the responsibility of architects. However, to offer accessibility for a barrier-free environment, the city needs designers (architects, builders, urban planners, etc.). The difficulty is to depart from the current methods, which largely disregards the presence of individuals with disabilities.

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Barrier-free design is really only functional if there is no disruption in accessibility, because the absence of just one of elements is absent renders the whole design inaccessible. Full accessibility might not be possible in the short term due to issues with profitability and enforcement, but a prioritized course of action should be created to of attain total accessibility in the medium to long term. Regional governments must develop a framework that details the process in which present inadequate access could be upgraded for the purpose of achieving strategic change in accessibility. Changes to the policies, practices, and procedures may be necessary as a result. However, many modifications can be done to enhance access without incurring significant costs. Anyone can become disabled at some point if the physical environment cannot meet his or her needs. Environments with physical barriers, however, turn into prisons for people who have chronic impairments. Public spaces must be modified to incorporate solutions for inclusive design—design for all—by local authorities who are tasked with ensuring that every citizen has equal access. To do this, local governments should include architects and planners who've had experience using inclusive design in real-world settings on the design team.

It also illustrates how a nation's disability laws lose all significance in the absence of thorough regulation, instructions, an auditing system, implementation, public consciousness and information. It is obvious that disabled people's needs must be included in professional design curricula right away.

4.6   Analysis Interviews with Experts

This section of the report discusses the analysis of data obtained from in-depth interviews with five experts in the field of accessibility, namely Prof. Deepak Pant sir, Er. Ananta Baidya sir who is currently based in the US, Mr. Kiran Shilpakar, the chairperson of NAPD-Nepal, Ms. Tika Dahal who is the president of Nepal Disabled Women Association and Er. Indra Bahadur Shrestha who is an expert in large scale public building design and construction.

Figure 4-1 Word Cloud Generated through In-Vivo Coding Analysis

From the word cloud generated through In-Vivo Coding Analysis, it was observed that the most discussed themes were implementation of guidelines, inadequacy of current curriculum in educational institutions, public mindset, safety factor in design and awareness in individuals and the public.

4.6.1 In-Vivo Codes

The application of thematic analysis allowed jumbled data to be transformed into a representation of the key themes through an iterative approach. There are six steps in the procedure:
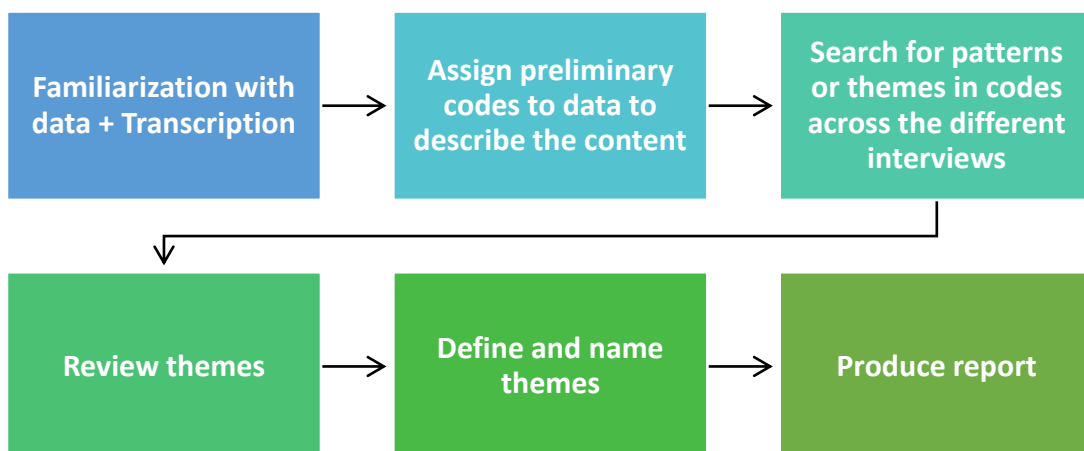
The interview transcripts were analyzed using in-vivo coding. The text was divided into topics and color-coded in accordance with those themes.

Prof. Deepak Pant

design that caters to people of any age, all capacity and physical conditions

increases the utility of any space

holistic thinking and approach

area of dryness around the topic of accessibility

develop understanding and compassion for those less physically or mentally able than us

self-learning process

mandatory accessibility features completely overlooked

Oudated knowledge

keeping up with updates in internationally acclaimed accessibility standards

lack of awareness on an individual level

guidelines are limited to codes and regulations

cost of specially designed elements is the same

inadequate lobbying and lack of influence

hesitates to embrace change

Clients are usually hesitant on spending space and expense

curriculum fails to encompass all components

Setting examples of barrier-free design

current building code needs to revise section on minimum accessibility

Universal design certificates and tax incentives for admirable efforts

failure to incorporate needs to be penalized by authorities.

all principal stakeholders arent well-educated on the subject

design should be able to convince client to incorporate accessibility

slow advancement of concept

disability does not mean someone cannot be a vital contributing member of the society

Discrimination and selfishness should never be tolerated.

transition into a community who gives equal respect and rights

Er. Ananta Baidya

providing right environment to all, irrespective of their ability

People have the wrong notion about what accessibility is

Safety factor isnt well thought of

Disability is looked at from a perspective of pity

PWD do not know how to acquire rights

Slow improvements have been coming along but it is not adequate

curriculum fails to encompass the essence of accessibility

fundamentals of accessible design in education level

Architects are responsible for compliance of accessibility standards

Society steeped into corruption and greed for money

architect have the power to be a part of a greater transition in the society

mindset must align with the concept

safety, appropriateness, functionality, geometry, dimension, equivalency and equitability

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Ms. Tika Dahal

design that caters to all and is safe and easy to use
discriminatory behaviour towards PwD
Independent mobility for all
violation of accessibility guidelines
Proper education of architects and engineers
Improvement and implementation of policies
monitoring and investigation of implementation
Mentality of public must be changed
vital contributors to society and its economy

Mr. Kiran Shilpakar

Accessibility for every person
infrastructures inadequate and unsatisfactory
discriminatory attitude of people towards PwD
misconception of added expenses
Upgrading and implementation of guidleines

Er. Indra Bahadur Shrestha

consideration of design requirements for PwDs
not a popular topic in the Nepalese community
clients need convincing to incorporate accessibility
need to keep ourselves up-to-date with changing standards
authorities are not educated on the topic of accessibility
lack of attention to accessible design
Improvements needed in the education of architects and engineers
Keeping up with internationally acclaimed accessible designs
The perception of people that accessibility features are unnecessary should change
Ease of access and mobility for everyone should be a vital requirement of any public building design.

4.6.2 Key Findings from Interviews with Experts

After that, the codes were filtered into first-order categories which shows the themes of lack of awareness, hesitation to embrace change, setting examples of barrier-free design, revision of guidelines tolerance of discrimination, inadequate curriculum, public mindset and the myth of added expenses. The second order themes include slow advancement of concept, implementation of guidelines, updates curriculum and public perception. Aggregated dimensions of the interviews comprise non-discriminatory design, upgrades in guidelines and public mindset.

Table 4-7 Thematic analysis of interview transcripts

Interviewee	First-Order Categories	Second-Order Themes	Aggregated Dimensions
Prof. Deepak Pant	lack of awareness hesitation to embrace change Setting examples of barrier-free design Revision of guidelines Tolerance of Discrimination Design that caters to all Inadequate Curriculum Tax Incentives & Recognition	slow advancement of concept implementation of guidelines updated curriculum	Non-discriminatory Design
Er. Ananta Baidya	Inadequate Curriculum Public Safety for All discriminatory design equivalent facilitation in historic sites infrastructures not compliant to regulations Public Mindset	Education of architects and engineers Accessibility for all	Non-discriminatory Design Upgrades in guidelines
Mr. Kiran Shilpakar	Public awareness about PwD rights Inadeqaute infrastructures Myth of added expenses Implementation of guidelines	Problems faced by PwDs Perception of public	Public mindset Upgrades in guidelines
Ms. Tika Dahal	Safety and ease of use Public mindset Education of architects	Problems faced by PwDs Public mindset	Public mindset
Er. Indra Bahadur Shrestha	Attention to accessible design Perception of people Awareness in authorities Upgrades in guidelines	Perception of people Upgrades in guidelines	Public mindset

4.7 Accessibility in Historic Spaces

Citizens with impairments still come across numerous issues in the physical setting, particularly in old buildings and locations, despite accessibility standards and laws. These are common in historic towns used as tourist as well as heritage attractions; they are also frequently used as communal spaces, workplaces, and educational areas, all of which require convenience, user-friendliness and approachability.

Particularly important consideration is given to maintaining historic and culturally significant sites and structures in older cities, demonstrating that cultural heritage protection takes precedence above the civil liberties of disabled individuals to have the advantage of independent use to the locations. Furthermore, the United Nations Convention recognizes the entitlement of PwDs to visit sites and monuments that have

cultural significance "as far as is reasonably practicable" (UN 2006, 22). It is established that legislations designed to protect historic sites and monuments are occasionally utilized for the purpose of evading the standards on accessibility. This is frequently projected as a means to restrain or evade the interpositions that must be made to make or boost accessibility. Thus, modifications needed or requested for improved accessibility may be constrained by environmental restrictions and conservation efforts.

Although it is important to protect the entitlements of PwDs, interpositions regarding conservation and/or modification of heritage settings and constructions frequently restrain and disregard the requirements and necessities of PwDs if the essence of the heritage site is at risk. To put it another way, there exists a propensity to defend as well as retain the heritage, veracity and genuineness of a location or structure at the expense of all-around approachability and usability, which excludes PwDs (Gleeson, 2001). The fact that open spaces in old cities are frequently utilized by public locations as nodes for recreation, commerce, services, and commuting, however, presents an additional and significant problem. Universal accessibility must be guaranteed because these locations are public spaces, workplaces, and commercial locations rather than being used for tourist or cultural purposes (Candlin, 2004; English Heritage Easy, 2015).

What barriers to accessing historic sites and buildings do people with disabilities face on a daily basis? Are conservation standards truly insurmountable? According to the findings, the reasons why accessibility isn't guaranteed in historic sites—and those on accessibility in general—are that they aren't properly applied or implemented out of carelessness or for aesthetic reasons. In actuality, those with disabilities often perceive the reasons for the lack of accessibility as justifications.

Because of certain constraints, it is required to think of alternate ways in which safe passage can be provided to PWDs. Alternative access instead of no access at all can be considered a viable option in situations such as this. In a heritage site, this wouldn't be categorized as discrimination as opposed to a movie theatre for example, where alterations in design could be made to provide equal access to the disabled and able alike. The idea of equivalent facilitation states that we do not have to provide the same facility but an alternative that meets the intent shall suffice in special cases.

The preservation of historical sites and structures, can co-occur with universal accessibility with a little common sense (Pretto, 2020). Municipal authorities are

frequently in charge of making decisions regarding a variety of issues, but occasionally they fail to consider the challenges that disabled individuals face, such as when navigating uneven terrain. Squares, streets, and pavements could be paved by local governments to make level surfaces lowering the hazard of accidents falling and need a reduced amount of upkeep than cobbled surfaces (Karrholm 2008).

4.8   Participation of PwDs

Even if standards are followed and construction is done in accordance to specifications, a site might not be totally accessible if the modifications are poorly constructed or not carefully designed. Such irresponsible attitude reveals an absence of knowledge and comprehension regarding the challenges faced by PwDs. According to the questionnaire survey, throughout several situations, such issues may be resolved by speaking to individuals with disabilities.

The experiences of the respondents indicate that the issues are frequently caused because architects, municipal managers, as well as other authorities only evaluate and comprehend accessible design in accordance with the standards and laws, which have become insufficient to ensure access and which tolerate exceptions whenever locations are regarded to be of national and architectural worth.

In order to coordinate and strategize PwDs' access to and utilization of heritage (as well as modern) structures and monuments, they must be included as they could make a significant contribution to both technical and socio - cultural knowledge. These consumers are indeed the experts of their own necessities and the characteristics and specificities of modifications that might be needed. Scholars, local officials, architects, as well as other leaders must view the fulfillment of accessibility as the attainment of a mutual objective termed "independence" as opposed to a contest or disagreement among them and PwDs (Wilkinson-Meyers et al. 2014). The fact that accessible design benefits everyone, including the authorities and planners, must never be forgotten. In truth, each of us has the potential to experience a disability (whether short or long term). Ease of access is indeed a value that each of us share, not just something that is provided for those with impairments (Pretto, 2020).

PwDs are often excluded—either directly or indirectly—from growth activities due to organizational, psychosocial, and structural barriers. This restriction has the effect of

fostering increasing inequalities, discrimination, and marginalization in societies. To overcome these, the initiatives should adopt an inclusionary approach for people with disabilities. In order to wholly engage in financial and socio-cultural life and to experience a quality of living as well as prosperity that is normalized in the society, people who are at threat of impoverishment and social marginalization must be provided with the prospects and opportunities they require. This practice is known as social inclusion. It makes ensuring that these groups have access to finances, resources, and facilities so they can exercise their civil liberties and engage in strategizing on issues that directly impact PwDs (Ministry of Health and Population, 2019).
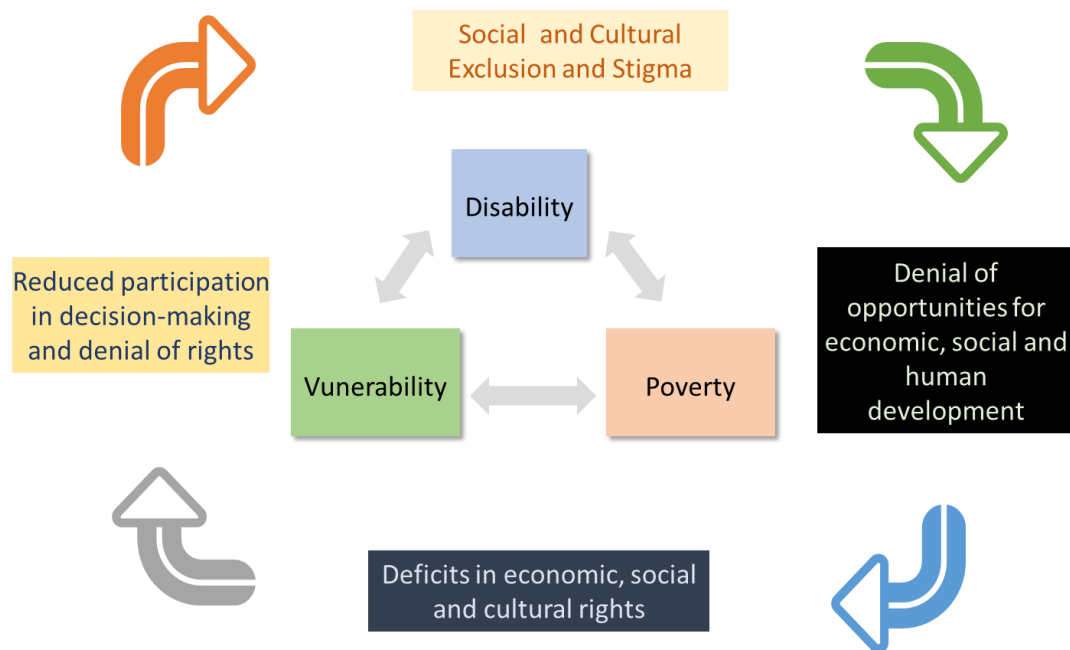
Figure 4-2 The relationship between human rights, poverty, vulnerability and disability

When a person with disability is unable to participate due to a combination of physical impairment as well as impediments, they are considered incapacitated. Therefore, the social system is to blame for making existence challenging for PwDs. Whenever obstacles are eliminated, PwDs are able to engage in activities on a level playing field with everyone else. As a result, people who have identical conditions might live vastly varied lives based upon the challenges they face, in the place that they live, how readily they can obtain services, as well as how society perceives and accepts them (Ministry of Health and Population, 2019). As per PwDs, disabled people's organizations (DPOs), and associations working for PwDs, there are numerous barriers preventing PwDs in Nepal from accessing facilities and assistance. These barriers include deprivation of assistance on the grounds of impairments, unpleasant behaviors of practitioners

and companies, a disregard for human decency, facilities that is physically difficult to access, an absence of amenities as well as an insufficient correspondence.
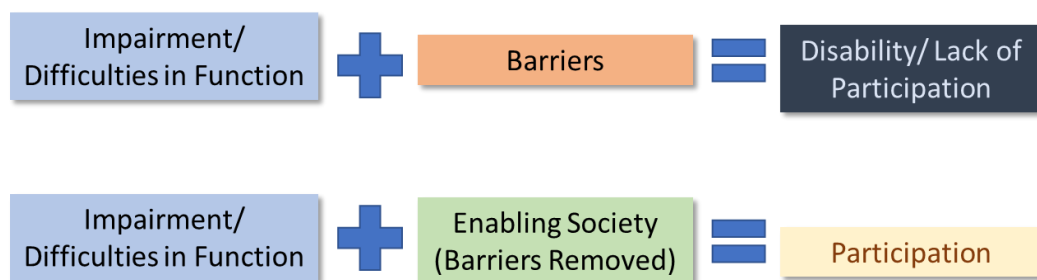
Figure 4-3 Impact of Barriers in PwD Participation

4.9   Public Awareness: Perceptions on Accessibility

The way we think or feel about particular people or circumstances is characterized by our attitudes, which are a multifaceted set of beliefs, feelings, values, and dispositions. In time, attitudes vary based on individuals. The biggest obstacle that PwDs must overcome is frequently observed in other people's actions. PwDs frequently encounter prejudice from the general public. They frequently feel forgotten or like their existence is being discounted. The majority of the general population has a tendency to view disabled individuals as an additional burden on families and the community. This is a consequence of a deficiency of knowledge about disability and the possible discriminations that happen on the basis of disability.

The majority of people hold the mistaken belief that because people with disabilities are less mobile than people without disabilities, accessible infrastructure doesn't need to be built. However, the deficiency of accessible infrastructure, marginalization as well as societal misconception associated with having a debility severely restricts their mobility (National Federation of the Disabled - Nepal (NFDN)., 2018).

Disability results from multifaceted exchanges between people and their milieu, that includes things like community, ethos, politics, geography, science, urban design and architecture. Society, one of the crucial components in this intricate relationship, has a big impact on PWDs' daily lives. Positive encouragement encourages them to demonstrate their abilities, whereas public stereotypes as well as partiality against PwDs may lower their confidence and self-assurance to engage in socioeconomic typical activities. In addition to poor societal support, PwD exclusion from mainstream

society is also a result of the values, policies as well as application of those in charge of designing the urban setting (Weisman, 2009). Similarly, those in charge of managing a public area or building can be considered key players in ensuring that visitors have a good barrier-free environment.

PwD rights have been covered by several statutes and decrees in both developed as well as developing countries. Even though some nations do not enforce these laws, the adoption of those guidelines, regulations, and laws shows a robust moral commitment as well as the government's backing for ensuring the rights and proper treatment of all citizens. The law serves as a proposal and a set of guidelines for authorities and practitioners to uphold moral standards in their work, but several practitioners disregard their ethical obligation to deliver the suitable amenities in the hope of saving money and making profits more quickly (Vierra, 2019). They are unaware that an accessible environment can yield greater profits than one that is difficult to access.

The accessibility audit reveals that inadequate attention is paid to fixing appropriate signage, managing infrastructures, and using color contrast, braille, audio, and graphic presentation. This frequently causes PWDs to be misled and to experience difficulties in navigating the spaces.

According to the interviews, the lack of exposure and social inclusion of disabled individuals in mainstream society is the main cause of negative attitudes and perceptions toward disabilities. Due to a lack of integration, people with disabilities are marginalized, and others are ignorant of and afraid of them because they have never had to interact, live with, or work with PwDs.

On top of various campaigns, the media can exert a significant influence on public opinion and change or create mindsets with the help of information and education. Instead of focusing on people with disabilities only when they require assistance, the media must highlight their accomplishments. This will contribute to changing the perception that those with impairments are a liability or an obligation to society. Finally, it is the responsibility of people with disabilities themselves to work to change societal perceptions through their work, skills, and positive outlook on life. They should not accept bias or lack of respect from other people or the media. They must urge the media to report truthfully and to portray people with disabilities in a positive, non-stereotypical light (National Federation of the Disabled - Nepal (NFDN)., 2018).

CHAPTER 5. CONCLUSION

This research has satisfied all of the four research questions mentioned at the beginning of the thesis. The first being, "what attributes do public places have that are universally recognized as "accessible" for people with vision and mobility impairments?". This has been answered by the various case studies of international journal articles and the study of globally acclaimed accessibility design standards for urban and architectural design. The knowledge of these attributes was used to identify and answer other research questions of the study.

The second research question had been "what is the level of compliance to guidelines in existing condition of public spaces and problems in implementation of the guidelines?". To determine the answers to this query, comprehensive access audits were carried out in 3 public open spaces and 10 public buildings of high prominence in the Patan area. The results of the access audit helped in understanding the issues with accessibility in the research setting. This thesis has illustrated a method for evaluating the public physical environment in regards to usability and accessibility. To evaluate the usability and accessibility of public areas, several factors were identified considering the theoretical foundation. As case study locations, a number of public plazas and buildings that represent Patan have been chosen. They are a reflection of urban development characteristics and the state of the built environment in developing economies.

Similarly, the third research question put forth was, "what issues do people with disabilities face in public spaces in the study area?". Separate questionnaires were prepared for public open spaces and public buildings to understand PwDs' level of satisfaction with accessibility provisions in open spaces and buildings respectively. The accessibility and use of public open spaces and buildings were evaluated with the help of questionnaire surveys in the case study areas. Respondents were also asked to mention what they thought were the main issues in those spaces and also to give recommendations that would make it easier for them to navigate those spaces. The assessment of public spaces through a questionnaire survey confirmed that they were unusable and had a declining character. According to the questionnaire survey's findings, the majority of Patan's public areas and buildings are inaccessible due to the following reasons.

- Inaccessible entrances

- No alternate paths for pedestrians

- Lack of pedestrian-friendly physical features in the streets

- Absence of sidewalks

- Roads serving as important traffic thoroughfares

- Non-compliant restrooms

Furthermore, public spaces and buildings in Patan are not utilized well due to,

- Lack of safety

- Absence of variety in services, activities and amenities,

- Lack of upkeep and sanitation,

- Lack of comfort.

The results of the field observations not only show the accessibility and use of public open spaces and buildings, but they also validated the information gleaned from the questionnaire designed for this study. The results of the questionnaire reveal that respondents with different attributes (age, gender, and occupation) shared some of the same insights. On the outcome of the parameters in the utilization of public buildings and open spaces, there were major commonalities in the responses. However, because the public areas in the study area lack these qualities, people tend not to use them as frequently as everyday people do.

The final research question asked "what measures could be implemented in the present or future to alleviate the existing complications in the study area?". Through in-depth interviews with experts, building manager surveys, and surveys of architects, this study also made an effort to delve into the country's accessibility issues. To learn about possible strategies, 5 experts in the field of accessibility were interviewed in depth. These interviews shed light to some of the most pressing issues that have been posing a hindrance in effective development of accessible design practice in Nepal. A few vital suggestions from the experts, regarding improvement in the quality of design and implementation have been documented. Likewise, interviews with a total of 64 architects demonstrated their perception of accessibility for the disabled, which affects the status of accessibility in the city. Interviews with building managers of the 10

studied buildings shed light on the attitude regarding the needs of PwDs from the perspective of non-architecture/planning personnel.

There should be more public open spaces in Patan, and they must be located in ways that ensure unbiased access and meet everyone's needs in terms of proximity. For instance, it should take no longer than 10 minutes to get to a neighborhood's public space. Furthermore, the areas need to be organized to draw in additional visitors and need to offer a wide range of amenities to draw in visitors with a variety of characteristics. Moreover, they need to be secure, well-maintained, clean, and meet people's expectations for comfort.

People with disabilities face difficulties in daily mobility due to issues with accessibility in public spaces. Unreviewed and inadequate policy, regulation, and upkeep of accessibility provision in communal infrastructure turn into grounds for failure of the design to meet the needs of PwDs. Additionally, the importance of including PwDs in the planning and design stages of cities. it is still unrecognized in developing nations.

The findings of this study indicate that these needs have not been satisfied, even throu gh the Lalitpur Municipality's best efforts to incorporate accessible design in pedestria n areas and recreation facilities. Neglecting participation of PwDs and an insufficient knowledge regarding accessible provisions for PwDs are two of the explanations why those amenities are not used by PwDs, the aged, or are disregarded by able-bodied citizens.

Activities in inaccessible settings present some difficulties and embarrassments for disabled people. But disabled people work to get past obstacles in the environment both physically and socially in order to engage in and participate in social activities. By demonstrating their abilities and capacities in public settings and society, people with disabilities and people without disabilities can both benefit (Hayati & Faqih, 2013).

The right to use public spaces for disabled people falls under their civil liberties, not as a favor for their acceptance in our society. Urban designers and other professionals working in the built environment need to put in more effort and demonstrate more compassion in order to fully integrate wheelchair users and other people with disabilities into society. Public spaces must be designed to become as convenient as possible for incapacitated people for them to participate in society effectively. They shouldn't just be built to comply with legal and regulatory requirements. The case study

shows that Patan needs a high degree of awareness regarding the "disability" issue from the general public, authorities, and built environment specialists.

In closing, it is normal for people to be born with disabilities or to develop disabilities later in life. Nevertheless, it is deplorable if public areas are constructed in a manner that prevents those with disabilities from using them. Relevant research on this subject emphasizes how the designs exacerbate the disabilities of people with disabilities. Making urban areas accessible to people with disabilities aims to enable their social inclusion, freedom of movement outside, integration into society and most importantly, to boost their confidence. The goal is to ensure that they have good mental and physical health, that they can participate in social activities, and that they can live in the same living conditions like other community members (Meshur, 2013).

CHAPTER 6.   RECOMMENDATIONS

Interventions to remove social and environmental barriers are necessary to address the challenges and isolation faced by people with disabilities in Patan's public spaces. In this case, it is important to ensure that there is a comprehensive legislative framework for disability-friendly environments and that urban design is efficient and inclusive. Below are some specific and general suggestions for the successful integration of disabled people into society, based on a review of the literature, results of access audits of the case study areas, surveys and interviews with experts, building managers, PwDs and architects. These suggestions are not binding; rather, they are intended to serve as a guide for future investigation.

6.1   Specific Recommendations (based on physical character)

Access

- A properly sloped ramp is needed for areas with higher elevations to promote wheelchair users' independent mobility. The ramp could then be used as a means of circulation for everyone, encouraging social interaction as well as access for the disabled.

- Wheelchair accessibility should be ensured by a proper slope and curb walkways at entry points.

- Appropriate handrails are needed for wheelchair users to move independently.

- The gateway should be big enough to let wheelchairs through.

Variety of activities

- Enhanced physical environment to guarantee daily activities that are required to increase PWD participation in social activities.
- Access to all activities for PWDs to participate actively or inactively.
- PwDs should be drawn to special events that don't exclude them from society.

Comfort

- The availability of walkways and corridors to ensure a safe, stable, and welcoming atmosphere for wheelchair users. These areas should have uninterrupted movement flow, even surface materials, and unhindered circulation.
- Public facilities for example restrooms, drinking fountains, and signage to uphold the wheelchair-accessible spatial standards.
- Daily cleaning services to guarantee quality and encourage attractiveness in order to project to users a user-friendly image.
- Interior furnishings for resting and relaxing, including seating areas.

Sociability

- Collaboration and interaction via spatial management.

6.2   Design Recommendations: Open Spaces

6.2.1 Mangalbazar

Figure 6-2 Ramps at different positions in Patan Durbar square
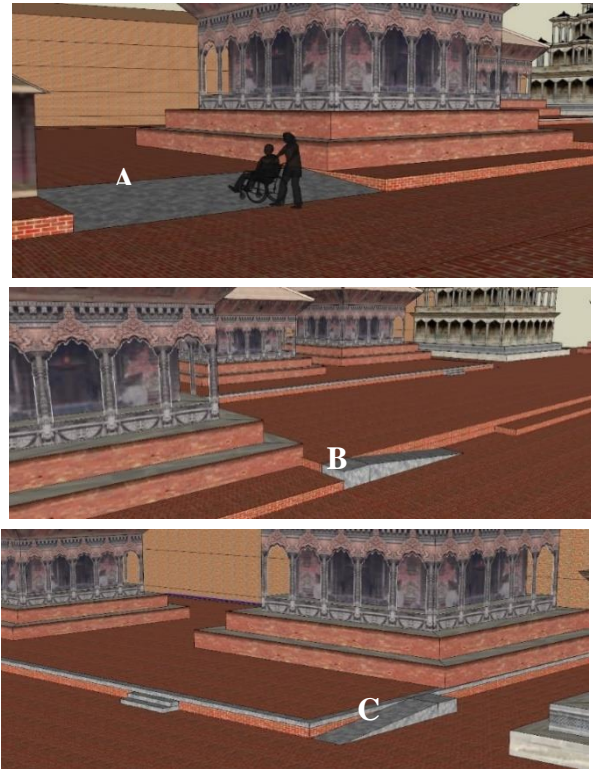
Figure 6-1 Ramps to access different levels

To provide accessibility to people with mobility impairments, ramps with stone or brick finishing that blends into the surrounding aesthetics are recommended in four different positions which will allow users to access different levels of the temple complex including the *dabali* where various social and cultural events take place frequently. However, there is a high probability of objections arising in respect to this design strategy since the durbar square is a extensively sensitive area of enormous historic value. Nevertheless, we can always brainstorm about new and innovative ideas to offer alternative or more preferably, equal access to such places so that people with disabilities do not experience exclusion from

6.2.2 Lagankhel

To provide accessibility to people with visual impairments, tactile tiles are recommended in sidewalks and specially at pedestrian crossings. Curb ramps of appropriate height and slope must be provided. The public toilet must be easily accessible by wheelchair and should have accessibly designed cubicles for PWDs. The signage must be available in audio and braille markers to indicate the presence of such facilities to visually impaired persons.

Figure 6-3 Tactile markings at pedestrian crossing

Source: Dreamstime.com
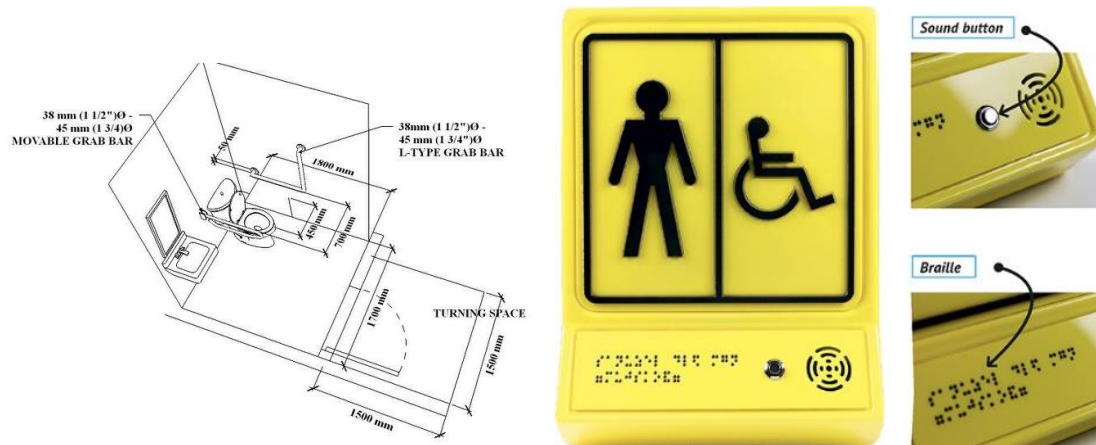
Figure 6-4 3D view of an accessible toilet

Source: Accessible by Design (2017)

Figure 6-5 Accessible Public Toilet Design for Lagankhel

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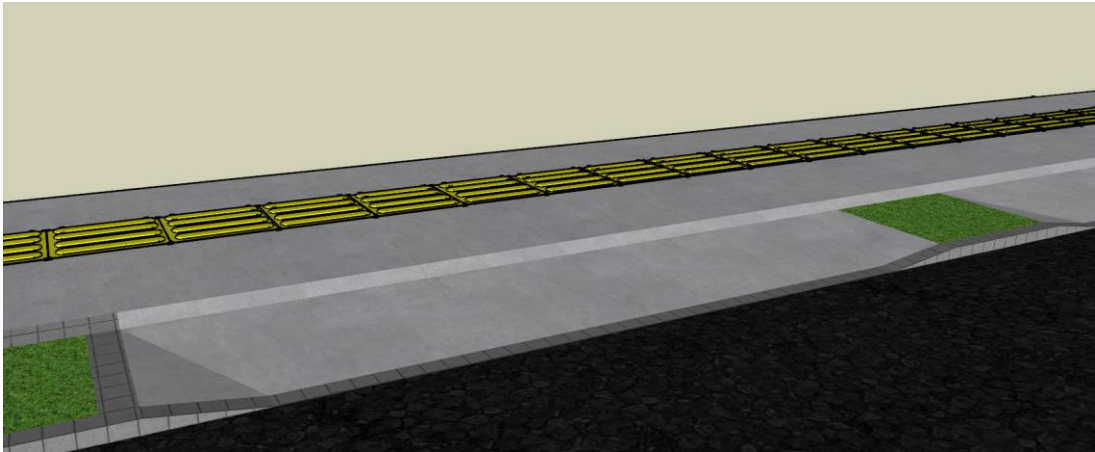
Figure 6-6 Sidewalk with tactile paving and curb ramp

6.2.3 Jawalakhel
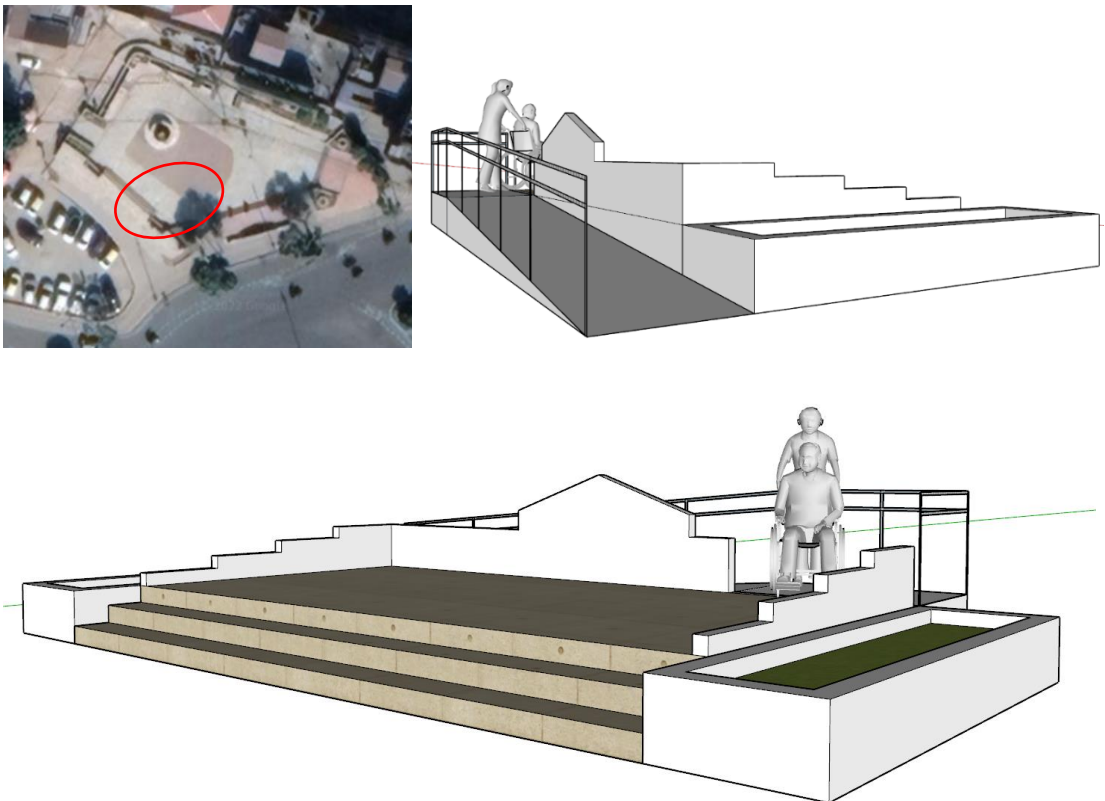
Figure 6-7 Ramp to access platform

Ramp is recommended at the platform to provide access to wheelchairs.

6.3   Design Recommendation: Public Buildings

The Lalitpur District Administration Office building at Thasikhel has been chosen for the demonstration of possible accessibility features that can be implemented at the public establishments of Patan. Various issues with the design, which were discovered and analysed during the access audit and observation of site, have been addressed through alternative design strategies illustrated through three dimensional models. Issues with the main entrance, reception counter, waiting area, staircase, bathrooms, access to upper floors and bathrooms, signage as well as markings and indications have been focused on.
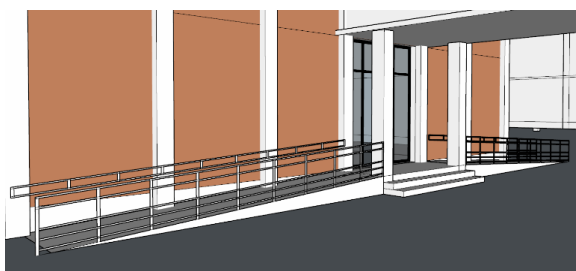
Figure 6-8 Ramps with proper handrails

The two ramps at either side of the main entrance have been redesigned with a slope of 1:18 ratio which is considered optimal for easy accessibility for wheelchair users. Handrails on both sides of the ramp have been provided for security and ease of use while going up the ramp.

Figure 6-9 Accessible countertops

At the main lobby, the inquiry desk with high countertops have been modified to consist of a space accessible to wheelchair users. Similarly, at the waiting area at the ground floor, proper seating arrangements and tactile tiles on the floor have been provided. Since, the depression on the surface of the floor had been
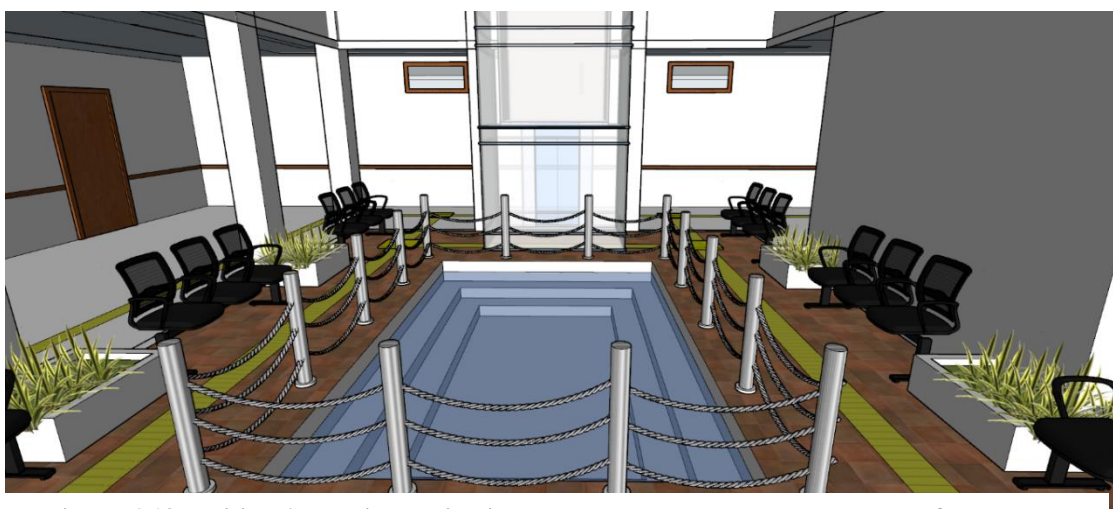
Figure 6-10 Waiting Area with tactile tiles and markers around hazardous surface

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left unfenced, it posed a serious threat to people, especially the disabled. The area has been fenced adequately to prevent accidents. An elevator has been provided to offer access to upper floors which would have remained inaccessible to PwDs otherwise.

Figure 6-11 Accessible Elevator and Corridors with handrails and tactile markers

Figure 6-12 Accessible signage and elevator buttons (with audio and visual indicators)

Signage should be clearly identifiable, placed at an accessible height so that wheelchair users can easily read the contents. Signage should also be available in braille in order to facilitate utilization by the visually impaired. The elevator buttons should be positioned at an appropriate height and must consist of braille and audio indicators. Handrails should be provided inside the car of the elevator. Tactile tiles should be provided in corridors to indicate the position of elevators.
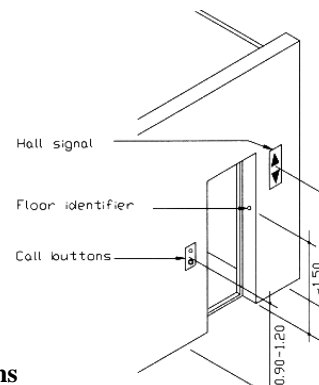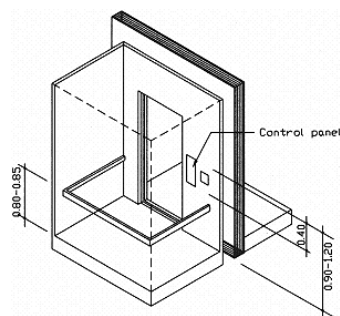
Figure 6-13 Accessible elevator car and buttons

Staircases in public buildings must have handrails on both sides, throughout the length of the stairs to guide the disabled. Doorways must have clear widths wide enough to give access to wheelchairs. The leaf of the door and handles must be easy to maneuver.

the existing bathrooms at the district administration is inaccessible due to presence of steps at the threshold. Bathrooms must be provided at the same level as the corridor to provide access to wheelchair users and to prevent accidents. At least one accessible cubicle with provisions following standard conformity to guidelines (see figure 6-4).
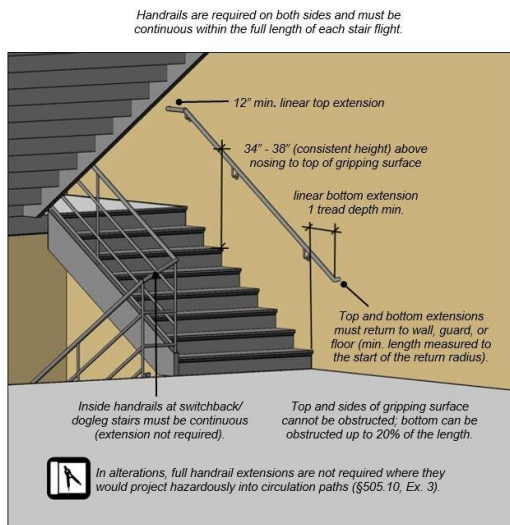
Figure 6-15 Stairs with handrails on both sides
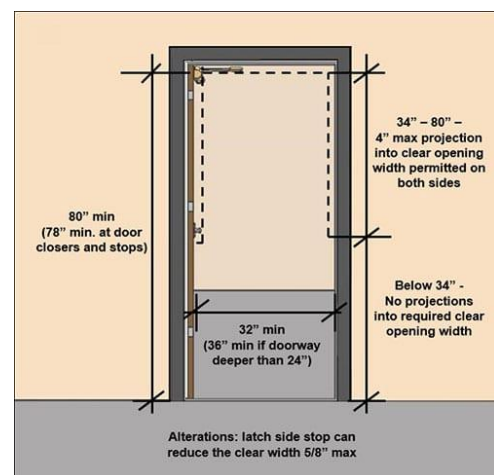
Figure 6-14 Adequately sized doorways

6.4 General Recommendations

The general recommendations mentioned below will help create accessible public spaces for a variety of stakeholders from a variety of disciplines, including government officials, state institutions, non-governmental entities, public health experts, built environment experts, and urban designers, among several others.

- **Adding to the body of knowledge:** To serve disabled people in the built environment effectively, the knowledge base pertaining to disabled people's spatial needs, special needs for ease of access and manoeuvrability in outdoor spaces, ergonomics, and their psychology inside of spatial practice must be researched and made available as an expertise to upgrade construction professionals.

- **Policy Updating:** National Policy Guides should include detailed policies that address all of the significant issues and aspects relating to the disabled. To guarantee the involvement of the disabled people everywhere, specific guidelines for maintaining a physically and socially accessible outdoor environment, both at the urban as well as building magnitude, should be developed immediately.

- **PwD Participation**: In addition to technical expertise, professionals must be aware of the spatial needs of the disabled from their own perspectives in order to ensure their involvement and engagement in the creation of universal spaces.

- **Promoting Awareness:** It's critical to acknowledge disabled individuals as valuable members of society in order to lessen the obstacles they encounter. To do this, it is necessary to increase awareness among handicapped persons, general citizens, and, most crucially, specialists in the built environment regarding equal rights of impaired people to utilize all societal facilities.

6.5 Barrier-free Design Certification

One possible proposal to encourage the use of barrier-free design in buildings is to provide certification of various levels based on the degree of accessibility provision. The goal is to broaden and accelerate the implementation of accessible design while helping certified professionals establish a network to help the idea take off, much like sustainability has in recent years. It is advised to adopt this generally effective paradigm in order to advance the application of UD principles. Government subsidies and

promotion could be given for commendable instances, encouraging additional developers to seek barrier-free design. For this purpose, a criteria checklist based on 169 available points, or credits has been outlined. The various levels of certification could comprise certifies, silver, gold and platinum ratings based on the degree of accessibility in the infrastructure.

As part of the certification process for barrier-free design, the checklist was created for use by access auditors conducting access audits of public open spaces and buildings. Based on the type of facility or service being audited, the user may utilize the checklist as a starting point and then develop and innovate it. The auditor may opt to follow the sequential format of the physical accessibility check list that has been developed. Three sections make up the checklist.

- **Section 1** – Discusses considerations to be used when evaluating the accessibility of urban design elements related to the outside and open spaces offered in the audited built environment. To obtain some of these information, the auditor may find it useful to speak with the building's administration and users with disabilities.

- **Section 2** – Analyzes the way services are delivered in the building that is being audited in the evaluation of architectural design. To obtain some of these information, the auditor might find it useful to speak with the building's administration and users with disabilities.

- **Section 3**- Evaluates cutting-edge concepts and tools that are used to design areas that are barrier-free.

Table 6-1 Barrier-free Certification Criteria

S.N.	CHECKLIST ITEMS	POINTS
	1. URBAN DESIGN CONSIDERATIONS	60
1.1	OBSTRUCTIONS	3
1.2	SIGNAGE	8
1.3	STREET FURNITURE	6
1.4	PATHWAYS	14
1.5	CURB RAMPS	6
1.6	PEDESTRIAN CROSSINGS	8
1.7	PARKING	15
	2. ARCHITECTURAL DESIGN CONSIDERATIONS	104
2.1	RAMPS	10
2.2	ELEVATORS	17
2.4	STAIRS	7
2.5	RAILINGS AND HANDRAILS	12
2.6	ENTRANCES	8
2.8	DOORS	14
2.9	CORRIDORS	4
2.10	REST ROOMS	25
2.11	SIGNAGE	9
2.12	EMERGENCY EXIT	8
	3. INNOVATION	5
	TOTAL POSSIBLE POINTS	169

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APPENDIX

APPENDIX 1: SAMPLE OF QUESTIONNAIRE

Accessibility in Public Buildings.

Name of the Enumerator
_____

Name of the Respondent
_____

User Information

Age

- ◯ Below 10
- ◯ 10-19
- ◯ 20-29
- ◯ 30-39
- ◯ 40-49
- ◯ 50-59
- ◯ Above 60

Gender

- ◯ Male
- ◯ Female
- ◯ Others

Type of Impairment

- ☐ Wheelchair user
- ☐ Person using 2 crutches
- ☐ Persons using one crutch
- ☐ Visual impairment
- ☐ Walker user
- ☐ Persons with low vision
- ☐ Difficulty in walking
- ☐ Others

If others, please specify
_____

Do you need help or assistance from others to move around?

○ Yes

○ No

○ Sometimes

Occupation

☐ Business

☐ Farming

☐ Private Job

☐ Government Job

☐ Social Work

☐ Others

What do you use for transportation?

○ None

○ Public Transportation

○ Bike

○ Scooter

○ Car

Labim Mall

Do you use the infrastructure?

○ Yes

○ No

If no, what is the reason?

_____

If others, please specify.

_____

Access to the infrastructure (physical structure)

○ Very Unsatisfied

○ Unsatisfied

○ Neutral

○ Satisfied

○ Very Satisfied

Accessibility inside the infrastructure (quality and quantity)

○ Very Unsatisfied

○ Unsatisfied

○ Neutral

○ Satisfied

○ Very Satisfied

Aesthetic Consideration (Maintenance and Cleanliness)

○ Very Unsatisfied

○ Unsatisfied

○ Neutral

○ Satisfied

○ Very Satisfied

Comfort (safety)

○ Very Unsatisfied

○ Unsatisfied

○ Neutral

○ Satisfied

○ Very Satisfied

Quality (Variety of activities or facilities for PWD)

○ Very Unsatisfied

○ Unsatisfied

○ Neutral

○ Satisfied

○ Very Satisfied

What are the obstacles you face when using the infrastructure?

_____

Recommendations

Do you have any recommendations for public building design?

_____

Any specific information?

_____

APPENDIX 2: Plagiarism Report

PUL076MArch017- SEBI NAKARMI- Final Report.pdf

ORIGINALITY REPORT

8%
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1	punarbhava.in Internet	1506 words — 3%
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APPENDIX 3: Acceptance Letter

त्रिभुवन विश्वविद्यालय
Tribhuvan University
इन्जिनियरिङ अध्ययन संस्थान
Institute of Engineering

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फोन- ५५२१५३१, फ्याक्स- ५५२५८३०

Date: September 14, 2022

To Whom It May Concern

This is to confirm that the paper titled *"Accessibility in Public Buildings for People with Disability: A Case of Patan, Nepal"* submitted by **Sebi Nakarmi** with Conference ID **12056** has been accepted for presentation at the 12th IOE Graduate Conference being held in October 19 – 22, 2022 at Thapathali Campus, Kathmandu.

Khem Gyanwali, PhD
Convener,
12th IOE Graduate Conference

APPENDIX 4: Accepted Paper for Publication

Accessibility in Public Buildings for People with Disability: A Case of Patan, Nepal

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Abstract:

Nowadays, there is growing local, national, and international awareness about the enormously widespread worldwide problem of disability. As a result, accessibility in built environments is crucial for a variety of reasons. Today, not every person can enter a building or an office successfully. The United Nations' policy that states "No piece of the developed condition ought to be defined in a way that rejects certain groups of individuals based on their incapacity or frailty" is logically inconsistent with the situation in question.

The objectives of the study are to investigate the current status of accessibility in the public buildings of the historic urban core of Patan, Nepal. It is based upon detailed observations of accessible provisions through site analysis and photography with a focus on the access audit of new and old public buildings. The aim is to evaluate a specific environment's performance in terms of usability and accessibility for a wide variety of potential customers, including those with disabilities, and also to recommend accessibility enhancements.

The gaps in implementation of the urban design guidelines are revealed by the access audit. The access audit demonstrates the compliance of various public infrastructures with the accessibility guidelines provided by the UN Design Manual. The study's findings suggest that the majority of the public structures under study do not meet the accessibility requirements for people with disabilities to the same extent as they should, as no one of them registered full compliance with the guidelines. Overall, it is indicated that accessibility is not well-integrated into older public facilities whereas a few newer constructions have incorporated accessibility into their designs. The public space's performance elements fell between 56.18% and 14.71% short of guideline requirements. Based on these findings, the local administration and the community need to work more to provide more public infrastructures which are suitable for people with disabilities. The findings of this study could be a road map for managers, planners, architects and engineers for safe and inclusive built environment.

Keywords:
Disability, Accessibility, Universal design, Public space, Urban design, Social inclusion

1 Introduction

Disability is a circumstance, not a wonder. Everybody experiences these phases occasionally or at some point. Blackman, et al. [1] has stated that the elderly, sick, pregnant, large, young and people with baggage could all be portrayed as people experiencing a period of handicap. Even so, everyone has the right to live in dignity during such times. In this way, sensitivity cannot be a component of openness, yet each person has a special right to be open. In this way, planning professionals' commitment to a barrier-free outline doubles as their social responsibility.

Today, not every person can enter a building or an office successfully. Even for a group of people—children, the elderly, women, and people with disabilities like those who use wheelchairs, shopping carts, or child buggies, etc.—finding a place in a developed environment is occasionally still an incomprehensible problem. The United Nations' policy that "No piece of the developed condition ought to be defined in a way that rejects certain groups of individuals based on their

incapacity or frailty" is logically inconsistent with the situation in question. Two terms—"openness" and "portability," which need to be taken into consideration—are conveyed to us by the standard for outlining and organizing the developed condition. Here, the word "accessible" refers to the goal of empowerment [1].

The concept of universal accessibility refers to access, both structural and attitudinal, through the removal of barriers and the creation of environments that are practical for all potential users. Universal accessibility is essential to inclusion because it gives everyone a sense of autonomy, competence, and independence that enables them to use all areas of a space and actively engage with friends and family.

Thinking about barrier-free and UD principles is the most impressive and significant way to create livable urban environments. Creating appropriate architectural and structural settings, commodities as well as amenities in all social sectors, is a requirement for community development. The use of public spaces by certain demographics of citizens, such as the elderly, pregnant women, and people with disabilities, may be hampered by physical barriers. Designing for people with disabilities is essential because they frequently face unique and obvious access issues in urban areas. The needs of people with disabilities must be taken into account, and barriers that prevents them from enjoying time in urban public spaces must be removed. It is believed that by implementing UD standards, people with disabilities could obtain their rights to a city that is more hospitable and comfortable for them, reducing their dependence on others [2].

2 Objectives

The goal of this research is to assess the current availability and condition of built environment in the urban context of the historic core of Patan, Nepal. It aims at evaluating accessibility features in public spaces in the study area. The case studies are based upon detailed observations of accessible provisions, carried out in new and old public buildings and open spaces. To accomplish the purpose of this study, the following research question is analyzed. What is the level of compliance to guidelines in existing condition of public buildings? The findings of this

study could be a road map for managers, planners, architects and engineers for safe and inclusive built environment.

3 Methodology

This study is grounded in applied theory and quantitative methods to evaluate the current state of the built environment in public spaces and the application of accessibility features in accordance with best practices in the study area. This method emphasizes reality and existence, so the philosophical paradigm is classified as post-positivism.

4 Scope and Limitations

The current study has a few limitations that should be mentioned. Due to the broad subject, it has been restricted to two categories of disabilities: orthopedic impairment and visual impairment. Selective public buildings have been studied while taking time constraints into account because access audit is a labor-intensive approach. The buildings nominated here can be considered to be representative of all public spaces in Patan due to their eligibility for shaping general trend of public spaces in the contemporary city.

5 Research Setting

The third-most populous city in Nepal, Lalitpur, must increase accessibility and facilities to accommodate the requirements of PwDs who want to participate fully in society. The Central Bureau of Statistics of Nepal estimates that 513,321 people in Nepal are classified as PwDs, 4934 of whom reside in Lalitpur. While 818 people have low vision or are blind, there are 1669 (or 3.57 per 1000) people who are physically disabled (1.75 per 1000). The research setting, which is the historical core of Patan, is 1.22 sq.km in area and 5445.57 m in perimeter.

Examining the necessity of accessible urban public-built environment for people with disabilities in Lalitpur is one of the objectives of this study. A total of 10 prominent public buildings including government-service establishments, health and educational institutions and commercial complexes

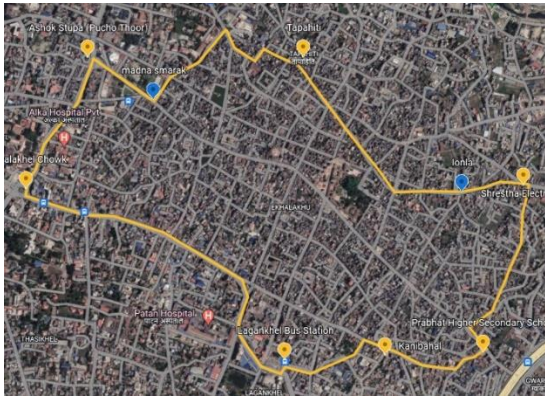from Patan have been selected through category-based sampling.

Figure 5-1 The Historic Core of Patan, Nepal

6 Literature Review

6.1 *What is Accessibility?*
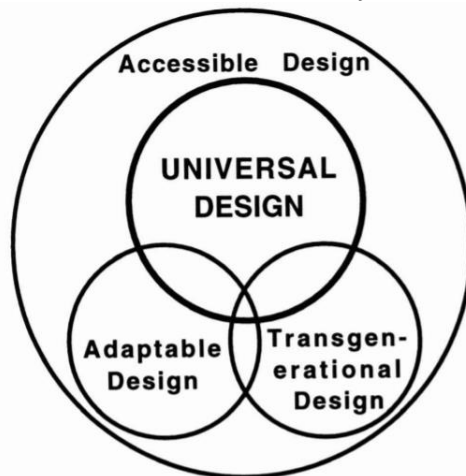
Figure 6-2 Association between universal, transgenerational, adaptable and universal design

Source: M.S. (2010)

In a nutshell, accessibility means having access to everything. Accessibility refers to an overarching concept for all elements that have an impact on how people interact with their environment, according to a technical definition. A well-planned urban environment is thought to be livable and easily accessible for everyone. Today, creating livable cities is a hot topic for many urban planners. There is general agreement that accessibility and people's mobility are important elements in designing livable cities. In light of this, one of the useful interactions

in a public area is accessibility. According to social theorists, accessibility is a fundamental social right. At the UN Conventions, where equivalent and non-discriminatory prospects for all are promoted in every spatial structure for communal use, accessibility is also a core value of urban design [3]. Because of the previously stated justification, accessibility is necessary irrespective of one's capability, age or position in society, in order for everyone to take benefit of the built environments [4]. Since moving around a city safely, independently, and conveniently is essential to urban living, everyone must be able to do so. According to this definition, a disability is any limitation or inability to perform a task that can be remedied by a suitable design. To accomplish this, it is believed that designers will apply their knowledge of various user needs more effectively in the real world [4].

PRINCIPLE ONE: Equitable Use
The design is useful and marketable to people with diverse abilities.

PRINCIPLE TWO: Flexibility in Use
The design accommodates a wide range of individual preferences and abilities.

PRINCIPLE THREE: Simple and Intuitive Use
Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

PRINCIPLE FOUR: Perceptible Information
The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

PRINCIPLE FIVE: Tolerance for Error
The design minimizes hazards and the adverse consequences of accidental or unintended actions.

PRINCIPLE SIX: Low Physical Effort
The design can be used efficiently and comfortably and with a minimum of fatigue.

PRINCIPLE SEVEN: Size and Space for Approach and Use
Appropriate size and space is provided for approach, reach, manipulation, and use regardless of the user's body size, posture, or mobility.

Figure 6-1 The Principles of Universal Design
Source: M.S. (2010)

6.2 *Accessible Design*

Design that complies with established applicable regulations for use by PwDs is known as accessible design. It can isolate PwDs from the vast majority of consumers and make them feel like an outsider

because it is frequently accomplished by offering distinct specifications for "special" user groups. When introduced as an afterthought to new building or even existing designs, accessible design solutions can be pricy and stigmatizing. Accessible features that are later added show that the designers did not take PwDs into account up until law was enforced upon its implementation [5].

Although universal design incorporates accessibility from the start of the design process, it is less obvious because it is always accessible. Modifications to a conventional design are known as adaptable design features, and they serve to make the form useful for a person as required [6]. Similar to accessible designs, adaptable design elements can occasionally appear gimmicky, stigmatizing, and expensive [5]. Although adaptable strategies are occasionally used in universal design to achieve customization, it is best when all options are equally available.

Transgenerational design, also known as lifespan design, takes aging into account when creating products. Transgenerational design may not always take into account the full spectrum of potential impairments or other usability-affecting factors, such as differences between men and women, cultural differences, and literacy level, because it does not particularly address genetic ailments or changes that may occur as a consequence of an injury or disease. While some aspects of universal design are cross-generational, the strategy includes disabilities other than those that are age-related [5].

Therefore, universal design is accessible and sometimes adaptable across generations. The diagram shows how accessible design is divided into three categories: universal design, adaptable design, and transgenerational design. A design might fall into two of these categories at times and some might fit into all of them. Every single accessible design might not necessarily identify as universal. Some users are excluded by designs that are "accessible" but not "universal" [5]. Of the three accessible design approaches, universal design discourses all forms of condition and integrates accessibility into design strategies, making it the most inclusive and least stigmatizing [5].

6.3 *The Principles of Universal Design*

Ronald Mace, an architect, industrial designer, and wheelchair user, developed the initial universal design concept. To help direct the design process of environments, goods, and communications, Ronald

Table 6-1 Level of Compliance

Level of Compliance	Points Granted
Fully Accessible	1
Accessible	0.75
Partially Accessible	0.5
Not Accessible	0
Not Available	0

served as the leader of a team that included architects, engineers, product designers, and environmental design researchers in 1997. They created the seven universal design principles. The guiding ideas are listed here in brief.

7 Data Analysis and Findings

Sawyer and Bright [7] state that the purpose of an access audit is to "establish how effectively a certain setting functions in regards to accessibility and convenience of use by a diverse group of potential consumers, including individuals with impairments, as well as to propose access improvements," The gaps between the guidelines and implementation are revealed by access audit. In order to analyze the accessibility of the built environment, the UN Design Manual is utilized to assess application of architectural specifications in ten notable public buildings in the historic core of Patan and its periphery. This manual was chosen because it has a target audience that includes people with all kinds of disabilities and because the majority of the advised actions have been tried out in developed nations.

Its checklist consists of the ten groups, namely, ramps, elevators, platform lifts, stairs, railings & handrails, entrances, doors, corridors, restrooms and parking. These ten components were evaluated independently based on 85 distinct elements. Details of the evaluation criteria are provided in the Table 9-1 and Table 9-2.

Table 7-1 5-point scale

• Not Available (-)
• Not Accessible (NA)
•Partially Accessible (PA)
• Accessible (A)
• Fully Accessible (FA)

The research was carried out on June-July 2022 by the author. Descriptive statistics scores were utilized to gauge how closely the urban design accessibility checklist was being followed. 85 items in each facility were assessed for accessibility based on the requirements for the respective checklist items. An item that was utilized but was not designed properly was referred to as "partially accessible." The aggregate percentile and level of compliance for all checklist items were computed for each building. To calculate the percentage of accessibility compliance, the sum of acquired points was divided by the total number of items.

Formula for Calculation of Compliance score=

$$\frac{\begin{array}{c}(\text{Not available} \times 0) + (\text{Not Accessible} \times 0) + \\ (\text{Partially Accessible} \times 0.5) + \\ (\text{Accessible} \times 0.75) + (\text{Fully Accessible} \times 1)\end{array}}{\text{Total number of items}} \times 100\%$$

7.1.1 *Observation results*

The study's findings suggest that the majority of the public structures under study do not meet the accessibility requirements for people with disabilities to the same extent as they should, as no one of them registered full compliance with the guidelines. The most compliant one is Namuna

Table 7-2 Compliance Score Chart: Public Buildings

	0	NA (0)	PA (0.5)	A (0.75)	FA (1)	Compliance Score
District Court	31	7	6	10	31	48.82
Malpot Office	24	6	5	12	38	58.24
Nepal Bank	33	7	10	4	31	45.88
Municipality	21	7	4	4	39	51.76
Namuna Machh	17	0	2	6	60	77.06
Patan Hospital	13	3	6	9	54	75.00
District Office	24	8	6	6	41	57.06
Pulchowk Campus	26	8	9	2	40	54.12
Labim Mall	5	1	7	12	60	85.29
NTC Office	31	14	3	5	32	43.82

Macchindra School, which had a total accessibility percentage of 85.29% (see Table 7-3). However, for the most part, it is indicated that accessibility is not well-integrated into older public facilities whereas a few newer constructions have incorporated accessibility into their designs. The public space's performance elements fell between 56.18% and 14.71% short of the guideline requirements.

The highest compliance on accessibility were found in Labim Mall (85.29%), Namuna Machhindra School (77.06%) and Patan Hospital (75.0%). Indeed, Labim Mall is a relatively new space, and was designed with accessibility in consideration. Namuna Machhindra too is a newly constructed building designed with the consideration of accessibility for its students with physical and visual impairments. Patan Hospital scores 75% which is still inadequate for a public health institution. This deficiency could be attributed to the fact that the hospital is a relatively older construction which lacks maintenance and upgrading. The lowest compliances were found at NTC Office (43.82%) and District Court (48.82%). The majority of the components in these two facilities are incorrectly designed and constructed, including inaccessible stairs, upper floors, restrooms, and entrances.

8 Discussion

Rapid urbanization has a negative impact on many issues, including access to, use of, and the physical and functional structures of public buildings. Urban settlements' public spaces fall far short of the modern standards of more affluent cities, especially in developing economies [8]. In urban areas, there aren't many disabled people who can move around independently. This clearly demonstrates how little disabled people participate in urban life and social interactions, and how limited their opportunities are to move independently.

As case study locations, a number of public buildings that represent Patan have been chosen. They are a reflection of urban development characteristics and the state of the built environment in developing economies. According to the access audit findings, the majority of Patan's public buildings are

inaccessible due to the following reasons (see Table 9-3 and 9-4).

- Inaccessible entrances
- Non-compliant restrooms
- Lack of comfort,
- Absence of variety in activities and facilities,
- Lack of maintenance and cleanliness,
- Lack of safety.

The descriptive analysis of the data demonstrates the extent of application and usability of accessible design by PwDs. To guarantee the inclusion of individuals with impairments in our community and to uphold our commitment to the UN that "Everyone has the right of equal access to public service in his country," it is imperative that we address all of these issues and find solutions to the issues of physical and social exclusion of disabled people in the built environment.

8.1   *Key Research Findings*

i. Comfort and suitability factor of access to public buildings and facilities is substantially inadequate for individuals with impairments (PwDs).
ii. Standard conformity is apparent only in new establishments.
iii. Patan's public buildings lack the necessary amenities and accessibility for PwDs to feel comfortable.

9   Conclusion

People with disabilities face difficulties in daily mobility due to issues with accessibility in public spaces. Unreviewed and inadequate policy, regulation, and inadequate upkeep of communal infrastructures turn into reasons for the design failing to meet the needs of PwDs. Additionally, it is still unrecognized in developing nations how important it is to include disabled people in the planning and design stages of cities.

The findings of this study indicate that these needs have not been satisfied, even through the Lalitpur Municipality's best efforts to incorporate accessible design in pedestrian areas and recreation facilities. Neglecting participation of PwDs and an insufficient knowledge regarding accessibility for disabled people are two of the reasons why those facilities are not used by PwDs, the elderly, or are not recognized by able-bodied people.

Activities in inaccessible settings present some difficulties and embarrassments for disabled people. But disabled people work to get past obstacles in the environment both physically and socially in order to engage in and participate in social activities. By demonstrating their abilities and capacities in public settings and society, people with disabilities and people without disabilities can both benefit [9]. The right to use public spaces for disabled people falls under their civil liberties, not as a favor for their acceptance in our society. Urban designers and other professionals working in the built environment need to put in more effort and demonstrate more compassion in order to fully integrate wheelchair users and other people with disabilities into society. Public buildings must be designed to become as convenient as possible for disabled people in order for them to participate in society effectively. They shouldn't just be built to comply with legal and regulatory requirements. The case study shows that Patan needs a high degree of awareness regarding the "disability" issue from the general public, authorities, and built environment specialists.

In closing, it is normal for people to be born with disabilities or to develop disabilities later in life. But it is impermissible if built environment of the city are planned in a manner that prevents those with disabilities from using them. Relevant research on this subject emphasizes how the designs exacerbate the disabilities of people with disabilities. Making urban areas accessible to people with disabilities aims to enable their social inclusion, freedom of movement outside, integration into society, and most importantly, to boost confidence in themselves [10]. The goal is to ensure that they have good mental and physical health, that they can participate in social activities, and that they can live in the same living conditions like other community members.

10   Recommendations

Interventions to remove social and environmental barriers are necessary to address the challenges and isolation faced by people with disabilities in Patan's public spaces. In this case, it is important to ensure that there is a comprehensive legislative framework for disability-friendly environments and that urban design is efficient and inclusive. Below are some specific and general suggestions for the successful

integration of disabled people into society, based on a review of the literature, results of access audits of the case study areas, surveys and interviews with experts, building managers, PwDs and architects. Below are some specific recommendations based on the physical character of the buildings.

- A properly sloped ramp is needed for areas with higher elevations to promote wheelchair users' independent mobility. The ramp could then be used as a means of circulation for everyone, encouraging social interaction as well as access for the disabled.
- Wheelchair accessibility should be ensured by a proper slope and curb walkways at entry points.
- Appropriate handrails are needed for wheelchair users to move independently.

The gateway should be big enough to let wheelchairs through.

Table 10-1 Access Audit

S.N.	Technical guidelines	Accessibility compliance									
		District Court	Malpot Office	Nepal Bank	Municipality	Namuna M	Patan Hospital	District Office	Pulchowk Campus	Labim Mall	NTC Office
1	**RAMPS**										
	Ramp configuration	-	FA	-	-	FA	FA	FA	FA	FA	-
	Width (min 0.9m)	-	FA	-	-	FA	FA	FA	FA	PA	-
	Slope	-	FA	-	-	FA	FA	FA	FA	FA	-
	Landings	-	FA	-	-	FA	FA	FA	FA	FA	-
	Handrail	-	-	-	-	-	-	A	A	FA	-
	Surface	-	FA	-	-	FA	FA	FA	FA	FA	-
	Tactile marking	-	-	-	-	-	-	-	-	-	-
	Obstacles	-	FA	-	-	FA	FA	FA	FA	A	-
	Location	-	FA	-	-	FA	A	FA	FA	FA	-
2	**ELEVATORS**										
	Accessible path	-	-	-	FA	-	FA	-	-	FA	-
	Accessibility to all levels	-	-	-	FA	-	FA	-	-	FA	-
	Elevator cab	-	-	-	FA	-	FA	-	-	FA	-
	Control panel	-	-	-	A	-	A	-	-	A	-
	Audiovisual signals	-	-	-	A	-	A	-	-	A	-
	Floor surface	-	-	-	FA	-	FA	-	-	FA	-
	Colour	-	-	-	FA	-	FA	-	-	FA	-
	Opening/closing interval	-	-	-	FA	-	FA	-	-	A	-
	Floor number in braille	-	-	-	-	-	-	-	-	A	-
3	**STAIRS**										
	Width (min 1.5m)	FA	FA	FA	FA	FA	FA	FA	FA	A	FA
	Landing (min 1.2m)	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Nosing (40mm)	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Handrails (0.5m-0.9m)	A	A	A	FA	A	FA	A	A	PA	FA
	Tactile marking (min 0.6m wide)	-	-	-	-	FA	-	-	-	-	-
	Emergency stairs	-	-	-	A	-	-	-	-	PA	-
	Mechanical stairs (escalators)	-	-	-	-	-	-	-	-	FA	-
	Intermediate Handrails*	-	-	-	-	-	-	-	-	-	-
	Location of staircase	FA	FA	FA	A	FA	A	FA	FA	A	FA
4	**RAILINGS AND HANDRAILS**										
	Easy to grip	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Securely attached	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Horizontal extension (0.3-0.45m)	PA	PA	PA	PA	PA	PA	PA	PA	PA	PA
	Continuous throughout the full length	FA	FA	FA	FA	FA	FA	FA	FA	PA	FA
	Low positioned windows at landings	FA	A	FA	FA	PA	FA	FA	-	A	FA
	Space between handrail & wall (40-60mm)	-	-	-	-	-	-	-	-	FA	FA
	Easy to identify	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Distance between handrails (0.9-1.4m)	-	-	-	-	-	-	-	-	-	-
	Intermediate handrails*	-	-	-	-	-	-	-	-	-	-
	Height (0.85-0.9m)	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
5	**ENTRANCES**										
	Accessible primary entrances	NA	FA	-	A	FA	FA	FA	PA	FA	NA
	Access to conveniently located elevator	-	-	-	A	-	A	-	-	FA	-
	Clearly identifiable	FA	FA	FA	PA	FA	FA	FA	FA	FA	NA
	Landing dimensions	FA	FA	PA	FA	FA	FA	FA	FA	FA	FA
	Landing surface	A	A	PA	A	FA	FA	FA	FA	FA	FA
	Doors operate independently	FA	A	PA	A	FA	FA	FA	FA	FA	FA
	Clear door width (at least 0.90 m)	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
6	**DOORS**										
	Door opening	FA	FA	FA	FA	FA	FA	FA	FA	FA	PA
	Signage	A	A	PA	A	A	A	A	PA	A	A
	Color	FA	FA	PA	FA	FA	FA	FA	FA	A	FA
	Opened without much effort	FA	FA	FA	FA	FA	PA	PA	PA	PA	FA
	Opening interval	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Push-buttons for automatic doors (1.2-1.4m)	-	-	-	-	-	-	-	-	-	-
	Clear width of interior doors (0.8 m)	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Double leaf door (leaf width= 0.8m)	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Shape of handle	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Ht. of handles, locks, pulls (1.2-1.40m)	PA	PA	FA	FA	FA	FA	FA	FA	PA	NA
	Threshold	PA	PA	PA	FA	FA	FA	FA	FA	FA	NA
7	**CORRIDORS**										
	Width (min 0.90 m)	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Maneuvring through doors	FA	FA	FA	FA	FA	FA	FA	FA	PA	PA
	Differences in level bridged by ramps	-	FA	-	-	FA	FA	PA	NA	A	NA
	Obstruction	FA	A	FA	FA	FA	FA	FA	FA	FA	A
	Surface	A	FA	FA	FA	FA	FA	FA	FA	A	FA
	Signage	A	A	PA	A	A	A	A	PA	FA	A
	Tactile marking	-	-	-	-	FA	A	-	-	-	-
	Handrails	-	-	-	-	FA	FA	-	-	-	-

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Table 10-3 Access Audit

S.N.	Technical guidelines	Accessibility compliance									
		District Court	Malpot Office	Nepal Bank	Municipality	Namuna M	Patan Hospital	District Office	Pulchowk Campus	Labim Mall	NTC Office
8	**REST ROOMS**										
	Accessibility	NA	NA	NA	NA	FA	PA	NA	NA	FA	NA
	Signage	A	A	A	A	A	A	A	PA	FA	-
	Threshold	NA	NA	NA	NA	FA	PA	NA	NA	FA	NA
	Fixtures										
	WC/bidets ht. (0.45-0.5m)	NA	NA	NA	NA	FA	FA	NA	NA	FA	NA
	Distance bet. toilet seat & wall (0.45-0.5m)	PA	PA	PA	PA	FA	FA	PA	PA	FA	A
	Wash-basin height (0.80 m-0.85 m)	NA	NA	NA	NA	FA	PA	PA	NA	FA	NA
	Grab bars height (0.85 m -0.95 m)	-	-	-	-	FA	-	-	-	FA	-
	Grab bars diameter (30 mm-40 mm)	-	-	-	-	FA	-	-	-	FA	-
	Grab bars clearance (35 mm-40 mm)	-	-	-	-	FA	-	-	-	FA	-
	Grab Bar Texture	-	-	-	-	FA	-	-	-	FA	-
	Grab bar Strength	-	-	-	-	FA	-	-	-	FA	-
	Faucets										
	Easy to grip and operable with one hand	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Pipes										
	Are hot water pipes insulated or covered?	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Accessories and controls										
	Mirror ht (max. 1m)	NA	NA	NA	NA	-	NA	NA	NA	FA	NA
	Alarm system	-	-	-	-	-	-	-	-	-	NA
	Wall mounts ht (0.5-1.2m)	-	-	-	-	-	NA	NA	-	FA	NA
	Flushing mechanisms easy to operate	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Flooring										
	Skid-proof, well drained and waterproofed	PA	PA	PA	PA	FA	PA	NA	PA	FA	PA
	Doors										
	Opening (min 0.75 m)	A	A	A	A	FA	PA	A	FA	FA	A
	Releasable from outside (emergency)	NA	NA	NA	NA	FA	PA	NA	NA	NA	NA
	Do pivoted doors open outward?	FA	NA	NA	NA	FA	NA	NA	NA	FA	NA
9	**PARKING**										
	Number (1:50)	-	-	-	-	-	-	-	-	FA	-
	Location	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Dimensions (3.60 m)	PA	PA	PA	PA	FA	FA	PA	PA	FA	FA
	Drop-off areas (3.6m +1.2m)	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Surface	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
	Signage	-	-	-	-	-	A	-	-	FA	-

Table 10-2 Location details of sampling areas

Name Location in City	Functions of the infrastructure	Present condition	Problems faced by PWDs	Plan/Aerial Map
Labim Mall, Pulchowk	• Commercial complex	• Designated parking spaces • Accessible toilets • No signs and markers for the visually impaired • Provision of elevator, escalators and ramps.	• Ramps at the entrance are locked. • Inability to shop independently	
Pulchowk Engineering Campus	• Educational Institution	• No accessibility features for visually impaired and wheelchair users. • Inaccessible toilets • No signs and markers for the visually impaired	• Inaccessible entrance in most blocks • Upper floors not accessible via wheelchair • No emergency exits.	
Nepal Telecom Office, Jawalakhel	• Government • institution	• No designated parking space • Inaccessible toilets • No signs and markers for the visually impaired	• Inaccessible entrance • Inaccessible toilets • Office rooms in upper floors inaccessible	

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Table 10-4 Location details of sampling areas

Name Location in City	Functions of the infrastructure	Present condition	Problems faced by PWDs	Plan/Aerial Map
District Court, Lagankhel	• Government establishment	• Inaccessible entrance • No designated parking space • Inaccessible toilets • Upper floors not accessible • No signs and markers for the visually impaired	• Inaccessible entrance • Court rooms at the first floor not accessible. • Inaccessible toilets	
Land Revenue Office, Lagankhel	• Government establishment	• Crowding • Inaccessible entrance • No designated parking space • Inaccessible toilets • Upper floors not accessible • No signs and markers for the visually impaired	• Office rooms at the first floor not accessible. • Shaded waiting area not accessible • Inaccessible toilets	
Nepal Bank, Gabahal	• Financial Establishment	• Inaccessible entrance • No designated parking space • Inaccessible toilets • Upper floors not accessible • No signs and markers for the visually impaired	• Inaccessible entrance • Office rooms at the first floor not accessible. • Inaccessible toilets	
Lalitpur Metropolitan City Office, Pulchowk	• Government establishment	• Inaccessible toilets • No signs and markers for the visually impaired	• Inaccessible park • Changes in levels at several places • Elevator frequently out of order	
Namuna Machhindra School, Lagankhel	• Educational Institution	• Accessibility features for visually impaired and wheelchair users.	• Upper floors not accessible via wheelchair • No emergency exits.	
Patan Hospital, Lagankhel	• Healthcare institution	• No designated parking space • Only one ramp available for the whole hospital. • Provision of elevators and handrails in corridors.	• Crowding • Inaccessible toilets at the emergency and general wards • No signs and markers for the visually impaired	

11   Acknowledgement

12   References

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