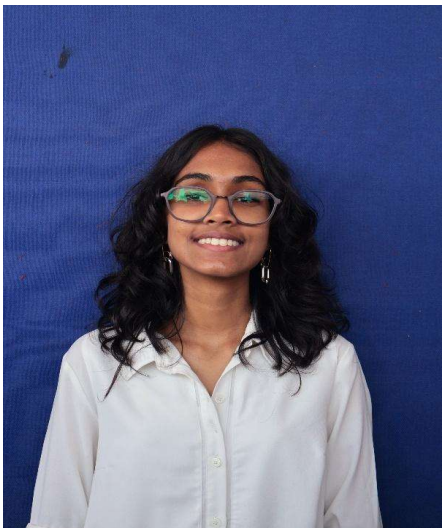
ISSN: 2582-8304

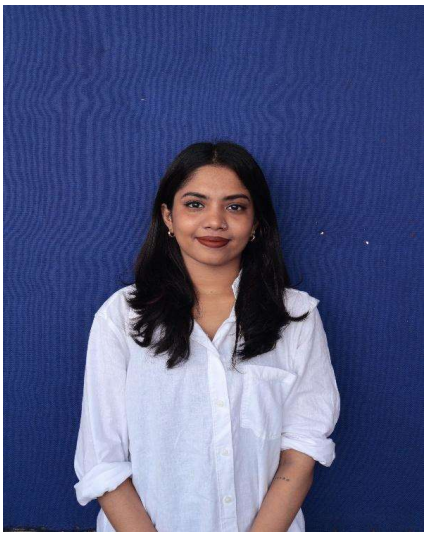


Ishita Kansal

Undergraduate, School of Planning and Architecture (B. Arch)

Ishita Kansal, 22 years old, is pursuing Architecture from School of Planning and Architecture, Bhopal, and is currently in the final year of the course. She is eager to delve into research and writing and express her thoughts. She strives to understand how architecture affects the people and their culture, and how it helps build their legacy. She is keen to explore diverse mediums of design. She is interested in different kinds of public spaces and creating unique experiences through design. She believes that spaces should cater to all people and accommodate differences.

ISSN: 2582-8304



Devika Prabhakar

Undergraduate, School of Planning and Architecture (B. Arch)

Devika Prabhakar is a final year architecture student at the School of Planning and Architecture, Bhopal. She has co-authored two research papers on the subjects of inclusive design and sustainability, reflecting her deep engagement with creating spaces that cater to diverse user needs. With core interests in urban design, spatial behavior, and cultural architecture, she likes to explore how design can foster accessibility and inclusivity across various environments. Her research emphasizes the importance of adaptable spaces that are both environmentally conscious and socially equitable, aiming to integrate inclusive principles into the core of architectural practice.

Indane Yash Atul

Undergraduate, School of Planning and Architecture (B. Arch)

Indane Yash Atul is a final year Bachelor of Architecture student at School of Planning and Architecture, Bhopal. Yash has authored 1 paper and co-authored 2 papers previously in the domains of multiculturalism, city identity, and design approach. His core interests lie in sustainable construction practices, human-centric design, and spatial experiences. Yash stands firmly by the belief that all buildings must be designed to be accessible to all intended user groups, regardless of how small the population of the minorities like specially-abled persons and socio-cultural groups is.

ISSN: 2582-8304

Research on Inclusivity for the Visually Challenged in Public Parks

Ishita Kansal Student (B. Arch) , Devika Prabhakar Student (B. Arch)

Indane Yash Atul Student (B. Arch)

School of Planning and Architecture, Bhopal

Abstract

An accessible city benefits all individuals who live, work, and play in that city. This means that the public spaces such as parks, libraries, and community centers, must be accessible to all, no matter their level of ability. Public parks are crucial spaces that offer opportunities for exercise, interaction with others, and exposure to nature. However, parks can pose considerable obstacles to accessibility and participation for people who are visually impaired. People who are visually impaired encounter a variety of difficulties in their daily lives as a result of the built environment's frequent strong emphasis on the visual component. They encounter a number of obstacles, including physical and social restrictions, as well as restricted access to park services and activities, when trying to enter public parks. The inclusion of visually challenged users in public parks is a critical issue while designing urban public and social spaces. This paper explores the challenges and needs of visually challenged people in public parks through literature studies. It also explores the themes of inclusive design and universal accessibility in public parks for visually challenged people. The study provides design requirements for public facilities that are currently in use that are more suitable, comfortable,

and inclusive for everyone, particularly for the blind. Finally, a suggestive matrix of parameters for analysis of the inclusivity for visually challenged people in public parks is proposed, based on the literature study thus conducted.

Keywords: ***Visually challenged, inclusivity, public parks, sensory design***

Introduction

A city park is a specific kind of public area that serves as the city's social hub and the site of outdoor recreation. But do parks really cater to all sorts of people?

Sometimes everyone is not able to access and reap the benefits of a public park, some people may be overlooked, and hence excluded. Parks are a complex public domain, with oftentimes no aid and ease for visually challenged users. Even the smallest of things, from an uneven tile to a tennis ball, can prove to be an obstacle, including other users.

Thodalay and Stoneham, in 1996, stated that "*it is the firm conviction of virtually every group representing the interest of disabled people that all facilities, including landscape, should be designed to provide universal access.*"

This statement reflects the significance of inclusivity, particularly when it comes to the design of green spaces. The relationship between the built and unbuilt environment is often misunderstood. As a result, green spaces thus designed only cater to certain specific user groups.

If the needs of all users, including those with special needs, are met, the city is said to be inclusive. By eliminating barriers that require extra work and promote separation, inclusive design aims to create spaces that anybody can use.

If the environment promotes users' equality, equity, and hassle-free life, it is deemed accessible (Mannion & Gutteridge). Accessible Design is accessible but not always inclusive, while inclusive design is always inclusive (Setiawan et al., 2021).

Dealing with vision loss is a difficulty in itself. The absence of emotional support, difficulty accessing activities and information, the stigma in society, and the lack of opportunities are all things that time and again keep blind or low vision people in isolation.

This paper analyzes the challenges and needs of visually challenged people in public spaces, especially in public parks. Further, through the literature review conducted, a suggestive matrix is derived as a checklist to analyze inclusivity in public parks.

Aim

To analyze public parks and propose a suggestive matrix of parameters for analysis of the inclusivity for visually challenged people in public parks.

Objectives

- **Understanding the challenges of a visually challenged user in a public park**
- **Examining the role of other senses in navigating in public parks**

- **To derive a suggestive matrix to analyze local public parks for inclusivity for visually challenged people**

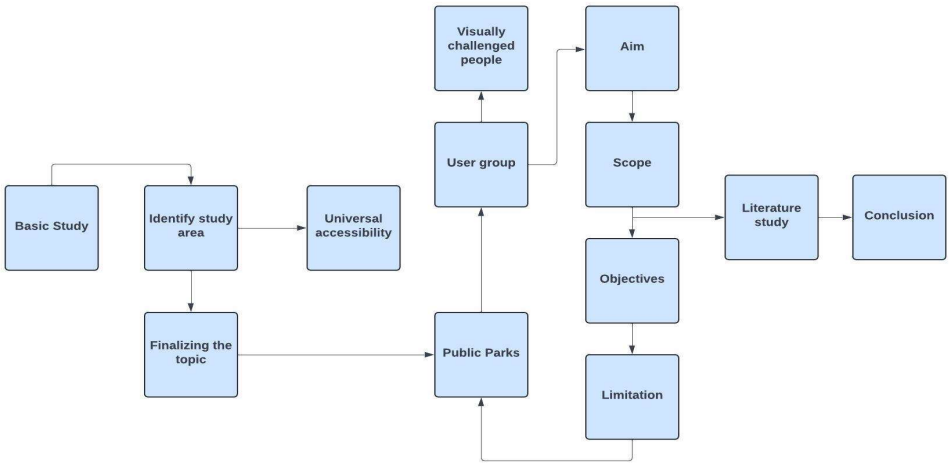
Research Questions

1. **What obstacles do visually challenged people encounter while accessing public parks? How can these obstacles be overcome?**
2. **What kinds of assistive technology can be used to improve the experience of visually impaired users in public parks and how can this technology be included into park design?**
3. **How are parks designed inclusively for visually challenged people in other cities or regions? How can they be modified and applied locally?**

Methodology

A basic study of public parks as urban public spaces and inclusive design was conducted. The importance of inclusivity in places as basic as parks was understood. This resulted in the identification of the study area as inclusivity in public parks and the main user group, which is the visually challenged people. Through the literature study, a prefatory understanding of the issues faced by them in parks and their needs was established. Multiple case studies of different parks around the globe, both with and without inclusivity will be conducted. Their analysis on how they have tackled the issue, or how they fail to address the needs and make the users more comfortable, will lead to the outcome of the research: to propose a suggestive matrix for analyzing one's local public park for accessibility for visually challenged users.

Flow chart showing the methods followed



Scope

The scope of the research is to understand how visually challenged people function in public parks and what are their needs. It also includes examining how other parks have implemented measures to do the same. Further study can establish design standards and considerations to follow while designing parks in the local area.

Limitations

This study only proposes a general analysis matrix for inclusivity in public parks, regardless of their location, region or the culture they are in. It is conducted purely through literature case studies. No live subject has been included.

Public Parks

Public urban parks have long been established as a way to provide large, green spaces inside of cities that can mitigate the effects of industrialization, on both the environment and the individual. Most developed nations have recently come to understand the value of

using public parks for various purposes to support the long-term sustainability of urban areas.

Public parks are an essential element to fulfill one's intrinsic need for culture, socialization, community, recreation and education. Parks play hosts a wide variety of programs like concerts, festivals, and cultural events. They are one of the most basic spaces for people to gather and spend time in their own manner, free of constraints (Tian & Kim, n.d.). With recreation and enjoyment getting highly commercialized, public parks remain a constant beacon for a plethora of users (Mannion & Gutteridge).

Sometimes everyone is not able to access and reap the benefits of a public park, some people may be overlooked, and hence excluded. Thus, it becomes vital that parks provide a safe space with equal opportunities to all. However, due to inconsistencies between different user needs and traditionally designed parks, many people are not given equal opportunity to participate in public parks.

Figure 1: Inclusion in Parks Source: oneability.ca

Figure 3. Inclusive Design Dimensions Source: https://legacy.idrc.ocadu.ca/

It is important to consider all the spaces where people conduct their daily activities, when creating an environment that is inclusive. Hence, ID is not just limited to the built environment, but encompasses the surrounding open areas as well. Design that is inclusive takes in mind the diversity and individuality of each person (*What Is Inclusive Design?*, n.d.).

Inclusive Design is based on majorly 7 principles, formed by a congregation of different professionals.

Table 1: Principles of Universal Design, Source: Kadir & Jamaludin (2012)

PRINCIPLE	DESCRIPTION
Reasonable Use	People with a range of skills can use the design, which is also marketable.
Usage Flexibility	A wide range of individual preferences and skills are supported by the design.

Easy and Natural Use	**No of the user's degree of expertise, knowledge, language proficiency, or present level of focus, the design is simple to use.**
Conspicuous Information	**Regardless of the environment or the user's sensory capabilities, the design efficiently conveys the relevant information to the user.**
Acceptance of Mistakes	**The design reduces risks and the negative effects of mishaps or unintentional activities.**
minimal physical effort	**The design is easy to use, comfortable, and causes little fatigue.**
Dimensions and Room for Use and Approach	**Regardless of the user's body size, posture, or mobility, an appropriate approach, reach, manipulation, and use area is supplied.**

Universal Accessibility (UA)

When something is designed to be universally accessible, it means that it can be utilized by individuals of all abilities without the need for any additional accommodations or adaptations. Having full access to all facets of life, including education, employment, leisure, and social activities, for all people, regardless of age, ability, or background, is the aim of universal accessibility.

Because it encourages inclusion, diversity, and equal opportunity, universal accessibility is crucial. It acknowledges that each individual has unique needs and abilities and that environments, services, and

products should be designed to take this diversity into account. By offering more convenient and user-friendly goods and services, universal accessibility can equally benefit persons without impairments.

Giving everyone the same access is what universal accessibility is all about. Persons with disabilities will never be completely integrated into society if they are unable to use the amenities and services offered by the community (United Nations, 2007). It is important to consider the accessibility element. The necessary and required arrangements should be established and taken into consideration during the project preparation stages (Suchana et al., 2021).

There are four kinds of design requirements that must be taken into account when constructing an accessible environment inside and outside of buildings, according to Rahim (2012) and AusAid (2013) (Table-02).

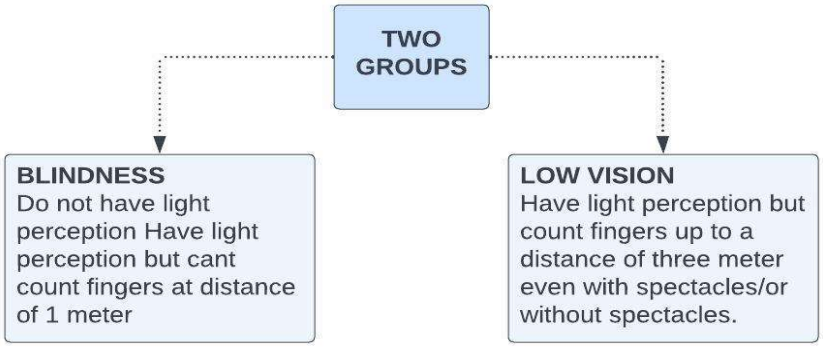
Table 2: Category of design requirement in Universal Design, Source: Rahim (2012)

REQUIREMENT	COMPONENT
Sensory	Tactile warnings, guideways and information
Outdoor environment	Obstruction, signage, street furniture, pathways, kerb, ramps, pedestrian crossing, alarms
Horizontal areas	Doors, entrance areas and lobbies, corridors, handrails, railings, and bridges

Vertical areas	**Ramps, lifts and stairs**

Visually Impaired People

People who have any degree of vision loss or impairment are considered to be visually impaired. From low vision, or partial sight, to complete blindness, there are many distinct types of visual impairment. Mobility, communication, and information access are just a few of the daily struggles that people with vision impairment frequently experience. However, people who are visually impaired can live full and independent lives with the aid of assistive technology, adaptive methods, and social support. The use of tactile indicators, learning braille, and honing memory and navigational skills are a few examples of adaptive approaches.



Source: https://www.re-thinkingthefuture.com/2020/03/16/a663-designing-with-the-blind-in-mind/

Therefore, vision impairment is not merely a health issue. It is a complicated phenomenon that reflects the relationship between physical characteristics of an individual and social characteristics of the society in which they inhabit. Interventions to remove social and environmental barriers are necessary to help people with vision impairments overcome their challenges.

Understanding Blind People

1. **Blind people make up for their lack of vision by placing more emphasis on their other senses.**
2. **Sound may be a vital resource when vision is lost.**
3. **Blind people can utilize smells to help them navigate an environment.**
4. **The tactile sense can be used to learn more about particular objects.**

It's crucial to keep in mind that people who are visually impaired are first and foremost people, and that their vision impairment is only one component of who they are. They deserve respect and dignity because they share the same abilities, aspirations, and goals as everyone else. In order to ensure that people with visual impairments may fully participate in community life, it is also crucial to keep accessibility in mind while building public areas, such as parks.

Design Criteria

The following should be taken into account while designing for the blind:

1. **In a difficult environment, those with reduced vision will rely on their memories. Rooms shouldn't be turned into a "labyrinth" to fix that. Additionally, rooms ought to be**

arranged perpendicularly rather than in a circle to avoid confusing the user. It is not always tactile paving that enables the visually impaired user to navigate; walls can also assist them.

Figure 4: Illustration of design criteria (personal representative) Source: Safikhani, 2013

2. **When the white cane touches the floor, the floor's materials should provide acoustic "feedback".**

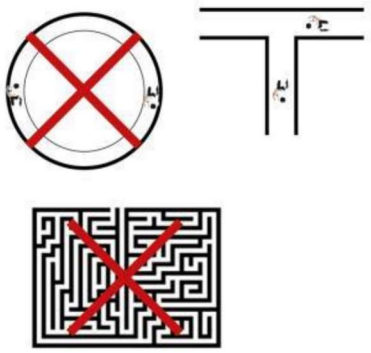


Figure 5: Illustration of design criteria (personal representative) Source: Safikhani, 2013

3. **Signage should be easily understood, including having a contrast tactile image and a contrast color (for people with low vision).**

Figure 6. Illustration of design criteria (personal representative) Source: Safikhani, 2013

4. **A flexible area or furniture that can be moved should not be present.**

Figure 7: Illustration of design criteria (personal representative) Source: Safikhani, 2013

5. **The positioning of specific objects that emit a particular odor can provide information for a direction guide or as a place marker.**

Figure 8: Illustration of design criteria (personal representative) Source: Safikhani,2013

The following is a matrix of the identified challenges faced by visually challenged people in public parks. Each of these challenges under it has parameters, which can act as both, part of the difficulty, or the solution, and can be used as a checklist while analyzing public parks for inclusivity. One may score 1 for each parameter fulfilled, and 0 for unfulfilled. At the end, the total score would be calculated out of 20, for 20 parameters. Parks falling in the range of 15-20 would be considered Good, 10-15 would be Average and anything less than 10 Needs Improvement. This way, parks which require attention can be identified and action can be taken on priority basis.

Parameters	Park 1	Park 2
Play activities		
Multiple options for use		
Multisensory equipments		
Spaces that help socializing		
Options to play together or along eachother		
Private zones		
Social amenities and oppertunities		
Public transit in close vicinity		
Restrooms		
Walking trails		
Boundary features		
Paths and entrances		
Percievable entrances		
Color coded information signs		
Attractive colors and visual features		
Accessibility		
Tactile surfaces		
Wide, continous and accessible pedestrian paths		
Points for rest		
Accessible social amenities		
Safety precuations in play equipments		
Natural features		
Aromatic gardens		
Open green spaces		
Proximity		
Proximity of play groups and social amenities to eachother		

Conclusion

Through the literature study, the above mentioned preliminary matrix for analysis of public parks for inclusivity for visually challenged people is identified. And this particular matrix can be used to analyze any public parks for inclusivity. This study also helps understand the need for inclusive design in even the smallest of public domains, like parks. The elements of ID and UA thus understood can be used to assist the research.

References

Mannion, G., & Gutteridge, S. (n.d.). Negotiating Inclusivity in Public Play Space: Re-interpreting Play Park Design with Children, Carers and Play Professionals. University of Stirling, Stirling Council.

Sarah M. Oteifa, Lobna A. Sherif, & Yasser M. Mostafa. (2017). Understanding the Experience of the Visually Impaired towards a Multi-Sensorial Architectural Design. International Journal of Architectural and Environmental Engineering, 11(7). World Academy of Science, Engineering and Technology.

S Boucherit, D Berkouk, TAK Bouzir, M Masullo, & L Maffei. (2022). A Review of Inclusive Design and Multisensory Interactions Studies and Applications in Public Spaces. Visions for Future Cities. IOP Conf. Series: Earth and Environmental Science.

Setiawan, N., Putra, F. F., Baktara, D. I., Ula, Z. M., Hayati, A., Bararatin, K., Rizqiyah, F., & Erwindi, C. (2021, April). DESIGNING FOR THE BLIND: MULTISENSORY DESIGN APPROACH FOR CITY'S PARK. architecture&ENVIRONMENT, 21(1).

Suchana, S. B., Khan, M. N., & Shoilee, S. M. (2021, June). Rethinking the Neighbourhood Parks of Dhaka city through the Spectacle of Universal Design to Ensure Accessibility for the Differently Abled People. Journal of Bangladesh Institute of Planners, 13.

Tian, P., & Kim, S. (n.d.). Research on the Elderly Friendly Park Based on Inclusive Design Concept.

What is Inclusive Design? (n.d.). Inclusive Design Hub. Retrieved May 9, 2023, from https://inclusivedesign.scot/what-is-inclusive-design/

ISSN: 2582-8304

Priya Thamaraikannan

4th Year B Arch (ongoing) ,

SB Patil College of Architecture and Design.

Ar. Neha

B. Arch (2010)- Smt. M.M. college of architecture college, Nagpur

M.Arch (2026)- Smt. M.M. college of architecture college, Nagpur

This is Ar. Neha Anwane, currently working in S. B. Patil College of Architecture & Design, Pune as Associate professor. I have 9 + years of experience in Academics and practice.

I have done my masters in Architecture education, which enables me to deploy ease of learning for students. Percolation of critical & creative thinking in students to have better outcomes.

ISSN: 2582-8304

Analysis of Residential Building Barrier-Free Design Planning for Outdoor Recreation Spaces and Provision of Inclusive Design Guidelines: Case Study Pune, India

Priya Thamaraikannan,

Ar. Neha Anwane,

Abstract

Barrier-free design is a way of designing buildings and spaces to make them accessible to people with disabilities or physical impairments. Barrier-free design prioritizes creating open spaces and built environments that accommodate people of all ages and abilities without requiring adaptations. Barrier-free planning extends beyond addressing the needs of physically able individuals; it encompasses a wide range of users across different age groups, including both the elderly and children. This principle is particularly important in the context of residential buildings, where open recreational spaces are mostly used by all age groups. With the implementation of numerous by-laws, there has been a noticeable improvement in the design aspects of open recreational areas, encouraging greater attention to accessibility and inclusivity in their planning. The purpose of this study is to focus on residential open recreation zones by analyzing and identifying barrier-free design features and providing guidelines for inclusive design standards for open recreation spaces that already exist.

Keywords: ***Barrier-free planning, recreational open space, inclusivity, guidelines***

Introduction

This is an environment that allows any person with a disability to navigate it safely and freely and one that allows them to utilize the amenities around them in the built environment. Barriers are communications and obstacles constructed in the built environment that prevent people with disabilities from accessing the facility using their own strength and potential. Barrier-free design aims at offering an environment as mentioned above. The goal of barrier-free design is to provide an environment that supports the independent functioning of individuals so they can get to, and participate independently in, daily activities such as procurement of goods and services, community living, employment, and leisure. The fundamental principles which have been followed in developing standards/norms for various facilities to buildings, health care institutions meet disabled people's standards for safety, convenience, and usability. Standards for barrier-free design must meet the needs of anyone who is hindered in their mobility or functioning (as compared with a nondisabled person) as a result of barriers created or presented by the design of a building, the selection of hardware and equipment, and the arrangement of outdoor space.

Aim

To analyze and provide guidelines for designing open recreational areas in residential buildings that will enhance accessibility and inclusivity through barrier-free planning, ensuring usability for all.

Objectives

- **To analyze current design practices and guidelines related to open recreational spaces in residential buildings through case studies.**
- **To identify the common barriers that limit accessibility and inclusivity in these spaces.**
- **To provide design strategies and guidelines that ensure recreational spaces are usable and inviting for all residents, regardless of age or ability.**

Methodology

This section outlines the research methodology employed in the analysis of barrier-free design in residential buildings, specifically focusing on outdoor recreation spaces in Pune, India. The approach is structured to ensure a comprehensive examination of existing practices and the development of inclusive design guidelines.

Study Area

Pune, a rapidly urbanizing city in India, is selected as the case study area due to its diverse residential layouts, varying socio-economic demographics, and the presence of both modern and traditional design practices. This context provides a rich ground for exploring inclusive design practices.

Data Collection Methods

Literature Review

- **Objective: To establish a theoretical framework and understand existing research on barrier-free design and inclusive practices.**
- **Process: Review academic journals, government publications, and guidelines on inclusive design from reputable organizations, focusing on both global and local perspectives.**

Site Observations

- **Objective: To evaluate the existing outdoor recreational spaces in terms of accessibility and design features.**
- **Process: Conduct field visits to a representative sample of residential areas, employing a standardized observation checklist focusing on elements such as pathways, signage, seating, and recreational facilities.**

Scope

- **The study focuses on open recreational spaces within residential buildings, particularly multi-unit housing developments in urban settings.**
- **The paper will analyze the needs of a diverse set of users, including children, elderly individuals, and people with disabilities.**
- **A comparative analysis of case studies of existing residential projects is included to provide practical examples.**

Limitations

- **This paper is limited to residential projects and will not cover public parks or non-residential spaces in India.**
- **It may be constrained by the availability of data or case studies specific to barrier-free recreational spaces.**

- **This paper will only focus on the open recreational areas in residential buildings, i.e., walkways, sitting spaces, access to the open space, and play zones for kids.**

Case Studies

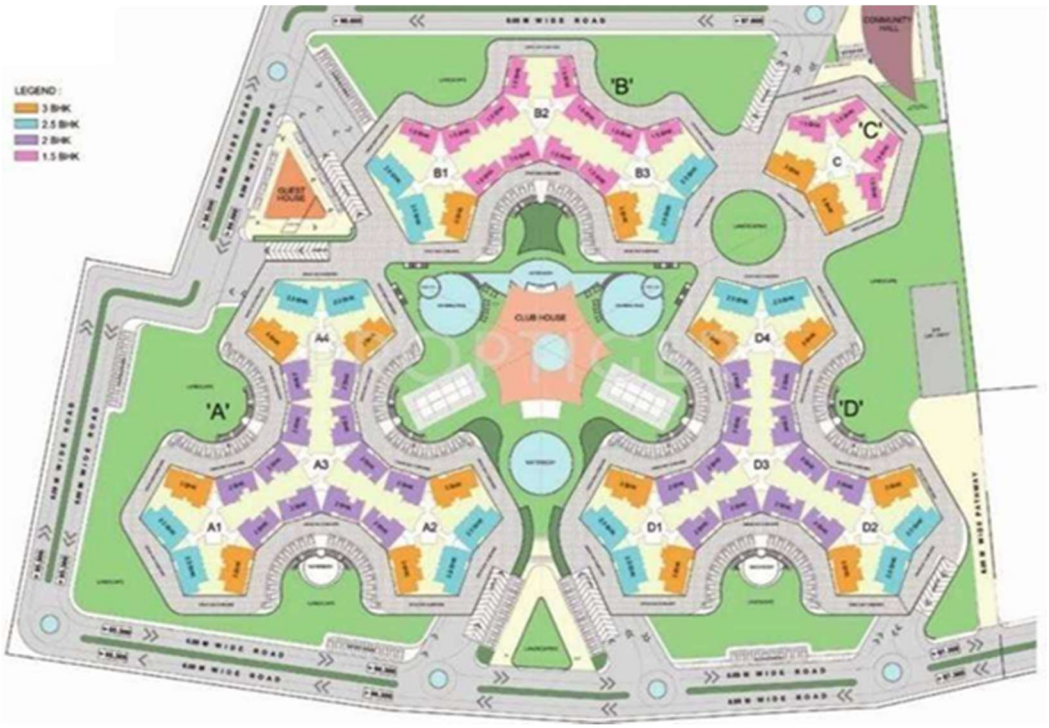


Fig 1: Site Plan

Case 1: Akshar Elementa, Tathawade

Walkway:

- **The walkways were of two types, where the main pedestrian walkways had a smooth, hard level surface suitable for walking and wheeling, and the walkway in the recreational areas was irregular, causing bumpy rides and being unsuitable for wheelchairs and walking sticks.**
- **The primary walkway width was 1500 mm, and the secondary width was 1200 mm for two-way movement.**

- **Suitable resting points were provided after every 60 m.**
- **Manholes and grates were avoided at the walkways, but obstructions such as trees, curbs (all locations), light poles, and fire hydrants while entering into a recreational space were observed.**
- **No walkways were crossing vehicular traffic.**
- **Non-slip flooring was placed at all locations.**
- **Tactile flooring was not provided at any point.**
- **No solid walkways were provided for the open gym, which can cause people to slip during the rain.**

Approach to Plinth Level:

- **The open gym area had no accessibility to plinths; the residents had to climb over the plinth to utilize the space.**
- **The senior citizens' sit-out, temple, and kid's sand pit play area had accessibility only through steps.**
- **No ramps were provided at any locations.**

Kids Play Area:

- **Two kids' play areas were provided, with one being a sand pit play area at opposite ends of the site.**
- **The skating rink had railings on all sides with a step up to access the space.**
- **Rubber flooring was provided.**
- **None of the kids' play areas were wheelchair accessible as they had a step up and stairs for accessing.**

Swimming Pool:

- **The swimming pool was accessible through a tile difference in the pavement, which had a steep slope.**
- **A baby pool was provided with railings on all sides.**
- **A single pool grab rail was provided for the pool and the baby pool each.**

Playgrounds:

- **A football ground with grass was provided with a steep ramp to access it.**
- **With a high plinth, no curbs were provided along the edges of the ground.**
- **Three net-covered courts, two for basketball and one for cricket, were located at different locations.**
- **The courts had concrete flooring, with the cricket court having sand at the top layer.**
- **All the courts had a step up and an obstruction of the curb.**
- **The walkways for accessing were 600 mm wide.**

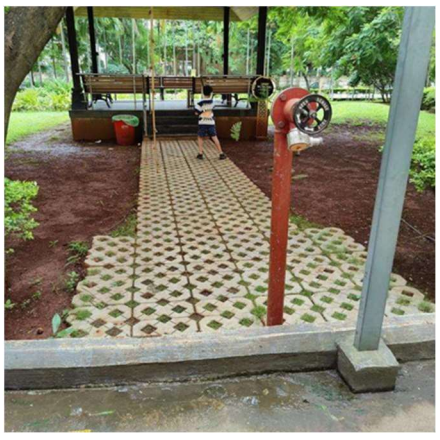


Fig 2: Access to Senior citizens sitout

Fig 3: Access to Football ground

Case 2: Celestial City, Phase 1, Ravet

Fig 4: Site Plan

Walkway:

- **The walkways are smooth, hard level surfaces suitable for walking and wheelchair use.**
- **The minimum walkway width is 1200 mm and the maximum is 2000 mm.**
- **Suitable resting points were provided all around the recreational space.**
- **Manholes, grates, and other obstructions were avoided at all points.**
- **The pedestrian walkway was mainly centrally located with ample sitting and easy accessibility.**

- **All of the spaces, except for the amphitheater, had to be accessed through a step up.**
- **The amphitheater was the only space with ramp accessibility with appropriate gradient.**
- **Tactile flooring was not provided at any point.**
- **Concrete paver blocks were used for walkways in all locations exclusive to pedestrians.**
- **The walkways were crossing the vehicular traffic while entering and exiting the space due to its location.**

Kids Play Area:

- **There are a total of three play areas provided, with two at podium level.**
- **All three play areas have rubber flooring.**
- **The play area at ground level is accessible through a step up.**
- **None of the play areas are wheelchair accessible.**

Swimming Pool:

- **The swimming pool is accessible through the clubhouse with a 450 mm step down.**
- **A baby pool is also provided with railing on one side to divide it from the swimming pool.**
- **The swimming pool has two pool grab rails, and another single pool grab rail is provided for the baby pool.**

Playgrounds:

- **A basketball court is adjacent to the clubhouse and has a 450 mm plinth.**
- **The court is covered with a net and is accessible through stairs.**

- **The court has rubber flooring.**
- **The access point for the court is where vehicular traffic is quite prevalent.**
- **No separate walkways were provided for accessibility.**

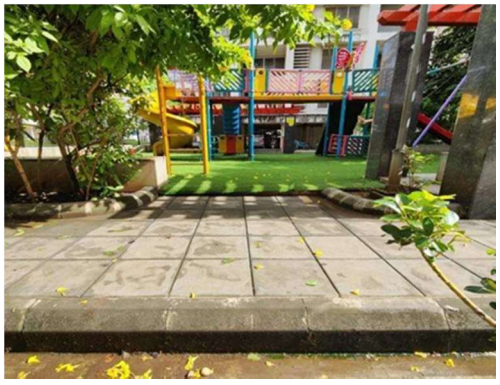


Fig 5:Access to Kids play area

Fig 6: Swimming Pool

Case 3: Queenstown, Chinchwad

Fig 7: Site Plan

Walkways:

- **The walkways are smooth, hard level surfaces suitable for walking and wheelchair use.**
- **Wide walkways of width 2200 mm were provided, with 1800 mm in certain locations.**
- **The walkways were of two types, where the main pedestrian walkways had a smooth paver block finish, and the secondary walkways had slate flooring.**
- **Suitable resting points were provided after every 25 m with ramps to access them.**
- **Manholes and grates were avoided at the walkways, but obstructions were present.**
- **No walkways were crossing vehicular traffic.**
- **No sudden level difference was observed; suitable gradient ramps were provided at all level differences except at places to access the recreational space.**
- **The recreational space is centrally located, allowing for easy accessibility.**
- **Tactile flooring was not provided at any point.**
- **The open multipurpose space had brown ceramic tile flooring.**
- **Ample shaded sitting space was provided.**

Approach to Plinth:

- **The recreational area has steps for its accessibility.**
- **The clubhouse, kids' play area, and the swimming pool have stairs for accessibility.**

- **No curbs were provided at any location, which could lead to people accidentally falling off the walkways.**

Kids Play Area:

- **In total, two sand pit kids' play areas were provided, one near the gazebos and another accessible through the clubhouse.**
- **The one at the clubhouse has step-down stairs to access it and is built over a 300 mm plinth.**
- **No defined walkways were provided for the play areas.**
- **The play areas were not wheelchair-friendly.**

Swimming Pool:

- **The swimming pool is accessible through the clubhouse with a 100 mm step down.**
- **A baby pool is also provided with railing on one side to divide it from the swimming pool.**
- **The swimming pool had three pool grab rails, and another single pool grab rail was provided for the baby pool.**
- **Non-slippery tiles were provided around the swimming pool.**

Playgrounds:

- **The site had three courts that were all merged together in a single court with a single access point that was accessible through a ramp.**
- **Two tennis courts and one basketball court were provided.**
- **Rubber flooring was added to the court.**
- **The court was covered with a fence and net fabric on one side.**

Analysis of Open Spaces

Aspect	Akshar Elementa, Tathawade	Celestial City, Phase 1, Ravet	Queenstown, Chinchwad
Walkways	Main walkways: smooth, level, 1500mm wide; recreational area walkways: uneven, unsuitable for wheelchair use; non-slip flooring, no tactile flooring; no crossing of vehicular traffic.	Smooth, hard level surface suitable for wheelchair use; width: 1200mm–2000mm; central pedestrian walkway, but walkways cross vehicular traffic; no tactile flooring.	Smooth, wide (2200mm) walkways; ramps available for easy access; no vehicular crossings; no tactile flooring.
Resting Points	Resting points provided every 60m, obstructed by trees and poles.	Ample resting points provided around the recreational space.	Resting points every 25m, ramps for easy access.
Plinth Accessibility	No ramps to plinth areas (open gym, senior citizens' sit-out, kids' play areas); all areas	Amphitheatre accessible by ramp, but all other areas (play areas, pool) require step-up.	Clubhouse, kids' play areas, and swimming pool accessible only via steps.

	accessible only by steps.		
Kids Play Areas	**2 play areas: both non-wheelchair accessible (steps, stairs); rubber flooring in skating rink, but access via step-up.**	**3 play areas: none wheelchair accessible; rubber flooring, but all require step-up for access.**	**2 play areas: both non-wheelchair accessible; built over a plinth with no defined walkways.**
Swimming Pool	**Pool and baby pool with single grab rails; steep slope and tile difference cause accessibility issues.**	**Accessed through clubhouse with a 450mm step-down; baby pool with single grab rail.**	**Pool and baby pool with multiple grab rails; non-slippery tiles around the pool.**
Playgrounds	**Football ground has a steep ramp, no curbs on edges; 3 courts (basketball, cricket), all with step-up access and narrow 600mm walkways.**	**Basketball court with 450mm plinth, rubber flooring; access through vehicular traffic areas.**	**3 courts (2 tennis, 1 basketball) merged into one area, accessed by a ramp; rubber flooring, covered by net.**

Overall Accessibility	**Most spaces are not accessible to people with mobility issues (e.g., wheelchairs, walking sticks); lack of ramps and tactile flooring limits inclusivity.**	**Partial accessibility: central walkway smooth and wide, but most areas (except amphitheatre) require step-up.**	**Most accessible of the three projects; wide walkways, ramps, and good connectivity to recreational spaces; however, no tactile flooring and some spaces require steps.**

Guidelines

Requirements for Access Route

The clear width of an access route shall be no less than 1200 mm, and for two-way traffic, it should be 1650 mm-1800 mm wide. Such access shall be free from protrusion hazards, steps, kerbs (other than dropped kerbs), steep ramps, doors, or doorways which will impede the passage of a wheelchair or other barriers that prevent access by persons with a disability. The surface of an access route shall be firm and non-slippery.

Ramp

A ramp is a sloping walkway leading from one level to another. Ramps of appropriate design shall be provided at all changes in level other than those served by an accessible lift or lifting mechanism accommodating the specific requirements of persons with disabilities. A ramp shall not be less than 1800 mm in width. A clear space of no less than the ramp's width shall be provided at the head and foot of

every ramp, meaning that door swings and alike shall not be allowed to swing onto the landing. No ramp shall be steeper than 1 in 12 gradients.

- **A kerb of at least 100 mm high or a rail 200 mm above ramp level shall be provided on both sides to prevent wheelchairs from slipping over the edge.**
- **No appliances, fixtures, and fittings shall project beyond 90 mm from the surface of any wall below a level of 2000 mm above the ramp level unless they are unavoidable, in which case they shall also be extended downwards to the ramp level or be guided by tactile flooring materials.**
- **The floor and wall along ramps shall be in contrasting colors.**

Kids Play Area

- **Ensure that entry points and pathways leading to the play area have ramps with gentle slopes (no steeper than 1:12 ratio) to accommodate wheelchairs and strollers.**
- **Use clear, high-contrast, and child-friendly signs in both Marathi and English to guide users to and around the play area.**
- **Install equipment at varying heights to accommodate children with different abilities, ensuring that a portion of the structures are accessible at wheelchair height.**
- **Secure the play area with safe, non-obtrusive fencing to prevent children from wandering, especially those with cognitive disabilities like autism. Gates should be wide enough for wheelchair access.**

Swimming Pool

- **Ensure that pathways leading to the swimming pool are wide enough (minimum 1.2 meters) and have smooth, non-slip surfaces to accommodate wheelchairs and other mobility aids.**
- **Provide ramps with a gradient not steeper than 1:12, leading to pool decks, changing areas, and entrances. Handrails should be installed on both sides of ramps, at a height of 850 mm to 900 mm.**
- **Wherever possible, provide a step-free entrance to the pool area to avoid obstacles for individuals using wheelchairs or walkers.**
- **Gradual entry ramps (sloping at 1:12) into the pool with sturdy, non-slip surfaces should be provided. Ramps should extend into the water and be wide enough (minimum of 900 mm) for wheelchair access.**
- **Handrails should be sturdy, non-corrosive, and placed at accessible heights (850 mm to 900 mm).**

References

1. *https://guide.inclusivedesign.ca/*
2. *https://mohua.gov.in/upload/uploadfiles/files/Harmonized_Guidelines.pdf*
3. *https://ijmir.org/doc/Vol-2-No-1-2022/Paper%205_Anjali_Architecture_3337_A%20Review%20of%20Barrier-Free.pdf*
4. *https://www.researchgate.net/publication/358285102_A_Review_of_Barrier-Free_Design_in_Built_Environment*
5. *https://www.aicte-india.org/downloads/Svayam-AICTE%20Guidelines-modified.pdf*