

Universal Design in Park Planning: A Case Study of Qutabyan Park in Erbil City

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Abstract: The paper focuses on how Qutabyan Park applied design principles to transform it into a social and ecological public space by inducing man-made environmental factors for adapting the microclimate while maintaining terrain accessibility to the community in Erbil. Through extensive analysis of the site, key issues such as lack of amenities, access, and degradation of the natural environment were identified, making the park unusable and un-marketable for the community members. Tackling these issues, the redesign includes accessible paths, shaded seating areas, and multi-generational play areas that cater to all ages and abilities. In addition, sustainable elements such as rainwater harvesting, native plant landscaping, and solar-powered lighting further contribute to the park's ecological benefits and lower resource use. This is a demonstration of how universal design can help in creating healthier urban landscapes by providing a model for inclusive, functional, and sustainable public spaces.

Keywords: Universal Design; Landscape Design; Urban Landscape Design; Redesign Project; Park Landscape Architecture.

1. Introduction

Parks are vital to urban infrastructure, providing spaces for relaxation, recreation, and social gatherings. However, conventional design frequently exceeds the needs of those with impairments, elderly individuals, and children in parks. The universal design addresses these disparities by enhancing accessibility and usefulness for all populations.

Universal design is the process of designing spaces and products to be used by the widest range of people without any need for adaptation or special design as well [1]. This means that social sustainability is met when access to resources or services is equal across all generations. The concept of universal design came in the 1980s, as coined by architect Ronald Mace [2]. They had focused on inclusiveness in the architectural field. Mace and his team had developed seven fundamental principles at the centre of Universal Design, which emphasised equity, flexibility, simplicity, perceptible information, error tolerance, low physical effort, and spatial accessibility.

These are the principles that lay the basis of universal design practices, allowing designers to create inclusive and functional environments. Integrating these guidelines into the early planning stages can be cost-effective and create sustainable, harmonious spaces. In landscape architecture, universal design allows access to all users, including people with disabilities, elderly people, and other limited mobility.

By addressing the need for inclusivity, it enhances the quality of life across different demographic spectrums [3].

Different studies focus on the effectiveness of universal design in urban planning. Concerning the study [4], the need to apply the principles of universal design in resorts and rehabilitation centres is indicated with a view to creating an aesthetically pleasing, accessible therapeutic environment. In a similar vein, the research of Kopeva et al [5] analyzed Vladivostok's urban green space regulations in trying to develop recommendations for making areas more accessible to low-mobility groups and proposing applicable strategies to parks and beaches worldwide. Another study [6] goes further to believe that accessibility is a human right and should be treated in the very initial structuring of urban planning. Furthermore, the study [7] proposes user-centered designs as ways of assuring inclusiveness and social integration within urban landscapes, while the study by Costa et al. [8] puts their weight on the importance of making sure the elderly and the disabled can travel independently in order not to be excluded.

Universal design principles embrace usability and accessibility by addressing physical, sensory, and cognitive needs. [9]. For example, parks with wide, firm, and stable routes accommodate the needs of wheelchairs, strollers, and perambulators. Open clues in the line of vision help the visitors with sensory impairments and those with cognitive ones. Various playgrounds and different types of recreational equipment ensure the opportunity to enjoy both people with different abilities and ample seating provides rest areas for older people and those with mobility impairments [10]. This would make parks a multi-functional ground for physical exercise, social interaction, and relaxation without barriers.

The article redesigns Qutabyan Park in Erbil from the perspective of universal design principles. This research evaluates how to increase access and functionality within urban green spaces for people with disabilities and those who have limited mobility. Besides that, some strategies have been proposed for overcoming some of the challenges related to noise and air pollution, poor infrastructure, and lack of biodiversity, which enhance inclusivity within the park landscapes. Some solutions include dense tree plantations to block out noise and fumes, water features to cool and beautify the surroundings, and durable playground equipment to ensure long-term usage.

The redesign aims to create a modern, inclusive, and environmentally friendly space. The methodology involved is evidence-based practices, and for the visualization and modeling of the transformations, advanced software was used, including AutoCAD, 3D Max, Lumion, and Photoshop. Qutabyan Park is remade as a vibrant, accessible, and multi-functional space by integrating universal design principles into this space to enable different social interactions and improve the quality of life for all members of society.

2. Overview of Qutabyan Park

Qutabyan Park situated in Zanko, extends over an area of 25,800 m² and is adjacent to the campus of Salaheddin University, placing it in a very good position for serving both students and neighborhood residents as shown in Fig. 1. For this reason, it has great potential as a collectively important place that the students at the university could use for relaxation and rest from studying, and residents of the neighborhood could engage in sporting activities and other social amusement. Yet, with so many issues concerning facilities, design, and accessibility, the full potential of Qutabyan Park has not been reached; it therefore makes the area highly restrictive in its usability and necessitates serving the needs of such a diverse community. These are some of the challenges that keep us from being in that inclusive, vibrant green space it can be for both students and local families alike.

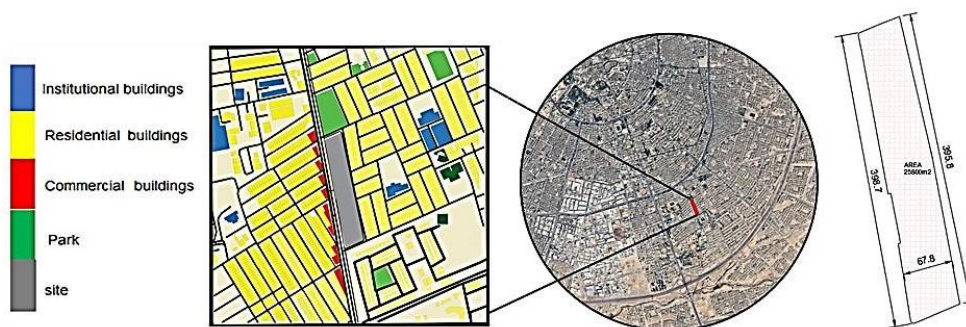


Figure 1: Maps showing the location and surroundings of Qutabyan Park, Erbil City

Qutabyan Park, before the renovation, had various seriously dilapidated amenities that were nevertheless usable. There were enough benches, although these were in very different conditions, as shown in Fig. 2; many of them were not usable anymore and had been provisionally repaired or finally replaced. Various, two water fountains were present on site, both not functional because of long-term maintenance problems. There was only one playground in the whole park, and it lay furthest, in bad shape, and undersized, given the whole area of the park. It further restricted its usability. A group of outdoor fitness machines lay nearby, but it was similarly broken and dirty, inappropriate to be used by the public. The administrative office lay at one corner of the park and, in some way, coordinated the affairs in isolation. While the entrance to the park was a gate with an arch, it had no link to the whole park since there were no continuities of design and materials. All these generally mentioned factors make the public space underutilized and not very gracious-that begged for its thorough redesign.

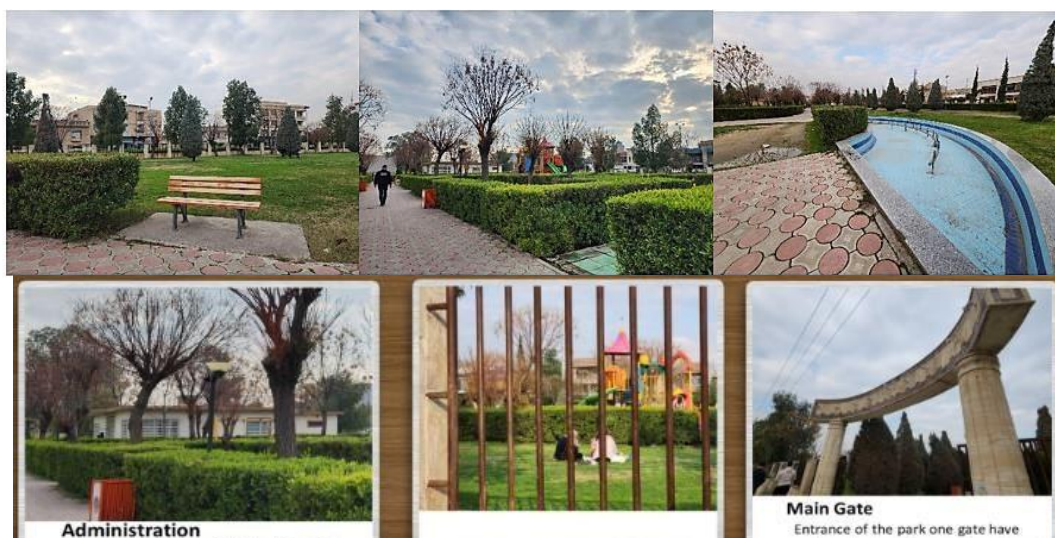


Figure 2: The existing environment of Qutabyan Park

2.1 Existing Problems at Qutabyan Park

Qutabyan Park has not been appropriately utilized as a public space where community interaction and entertainment can take place. The lack of usability and accessibility in many important details creates these issues: through accessibility, environmental degradation, and the absence or presence of community engagement, it reduces its potential as an important green urban space. While access issues render the park inaccessible to people with mobility impairments, environmental factors such as a lack of greenery and inadequate drainage also increase visitors' discomfort. The lack of suitable facilities, inadequate infrastructure, and security concerns hinder the community's active participation in making the park a friendly and inclusive meeting place. These issues have been analyzed under three primary categories: Accessibility Challenges, Environmental Degradation, and Community Utilization.

2.1.1 Accessibility Issues

Various access issues were designed into the park, making the area not very friendly for people with mobility impairments or disabilities to get around and enjoy. The pathways were not consistently well-maintained; the use of materials such as uneven pavement stones could be a potential tripping hazard, making it very hard for wheelchair users to get about. There was a general lack of facilities, or their placement was such that easy access could not be made available for people who needed to sit frequently or use the facilities quickly. Some of the main areas of the park, such as the playgrounds and sports zones, were inaccessible because they were too far away from the main entrance and/or without clearly accessible routes. The lack of connectivity and thoughtful planning has made it difficult to be inclusive; therefore, the park cannot be used by all in the community, especially those with physical challenges.

2.1.2 Environmental Degradation

Certain environmental problems beset the facility, such as but are not limited to a general lack of greenery, inadequate drainage provisions, and heat island effects impeding its usage. Green cover due to poor vegetation was hardly sufficient to provide cooling or maintain biodiversity, and hence, much of the area was left open to raw sunlight, thereby raising the level of heat in the area. Long days during the summer in Erbil further exacerbated the heat factor, which needed shaded areas to make parking a bit more comfortable. Poor drainage further exacerbated these issues since minimal amounts of rainfall were not captured or put to good use, adding to soil dryness and limiting plant health. Additionally, the surrounding urban environment increased the presence of noise and polluted air from the roads and residential buildings, which lowered the quality of air and further affected the atmosphere within the park. Addressing such environmental problems was essential to make the park experience sustainable and pleasant for all users

2.1.3 Community Usage

Parks serve as essential spaces for fostering social interaction, recreation, and overall well-being. However, their potential remains underutilized in many areas. Limited community engagement with parks is often attributed to insufficient facilities, substandard interior design, and inadequate security measures. Basic facilities such as seating, equipment in the playground, and fountains are either scant or irreparably damaged, thus making staying in the park less appealing and comfortable for users. There is just one playground, which is too small and not well-maintained; sports machines also wear out and are not good for use, again discouraging participants from being active. Moreover, the setup is poorly levelled and linked, making it difficult to navigate around, resulting in unusable places for individuals who have mobility issues. Similar safety concerns are emerging as well, with playground surfaces and other park features used by children and older adults wearing down over the years. These fractures of dishevelled infrastructure and lacklustre attractions, paired with perilous safety concerns, turn the community away from every opportunity to utilise this park, diminishing its capability to operate as a bustling neighbourhood congregation ground.

2.2 Site Analysis

The site investigation involved a wide application of various methodologies aimed at gaining a comprehensive understanding of environmental conditions, accessibility, and user needs in the park and surrounding areas. This process involved detailed, observational studies to evaluate existing infrastructure, identify potential barriers, and evaluate opportunities to improve usability, security, and the overall visitor experience. Additionally, data collection focused on analyzing ecological characteristics, movement patterns, and demographic profiles to ensure findings were based on inclusive and sustainable design solutions [11].

The observational studies on sun exposure, wind patterns, and sources of noise have served to establish shaded areas, ventilation by wind flow paths, and vegetation that can be used to reduce noise.

Ecological issues include scarcity of rain, which suggests incorporating a wastewater collection system for irrigation purposes within the landscape. Its proximity to residential areas, commercial spaces, and higher institutions also made it an important neighbourhood asset for students and residents alike. Community responses especially called for enhancements to park amenities, playgrounds, sports equipment, and seating areas for better use. This will be an inclusive, data-driven approach, underpinning the building of a full understanding of the park's potential to serve its diverse user base better and inform design decisions that focus on accessibility, comfort, and sustainability

2.2.1 Sun Path and Shading Analysis

Sun path and shading analysis is important for planning a park to strategically balance the amount of sunlight with shade for visitor comfort and energy efficiency, allowing its maximum use throughout the year [12]. The sunbathing path in Qutabyan Park is analysed and observed to show that with 14.6 hours of daylight in June, Erbil requires well-thought-out shading solutions to keep the visitor comfortable, as shown in Figure 3. This problem is solved in design by the strategic placement of high-density and tall trees throughout the park to create shaded areas running along most pedestrian paths to protect the users from long-term sun exposure. Additional sunlight blockers will be incorporated into the landscape to further cut down the direct sunlight in some areas, which helps provide a calm and cool atmosphere within the park. This will help improve comfort for the visitors and conserve the natural features of the park so that all visitors can have maximum utilization of the park at any time of the day, even during peak sun.

Fig. 4 shows the Qutabyan Park shadow analysis due to the low height of residential buildings around it. The shadow of these structures affects the park only in December. For the rest of the year, the site enjoys direct sunlight most of the day. This is suited to a positive advantage since most park facilities would require abundant sunlight exposure, solar-powered lighting, and abundant light. It is intended, with this analysis, that the design makes the best use of sunshine to promote energy efficiency and user comfort and create special shaded areas with trees and other landscape elements to provide relief where needed. In such a balanced way, its aim is to enhance the usability and attractiveness throughout the year and ensure that Qutabyan Park offers both well-lit and comfortably shaded areas.

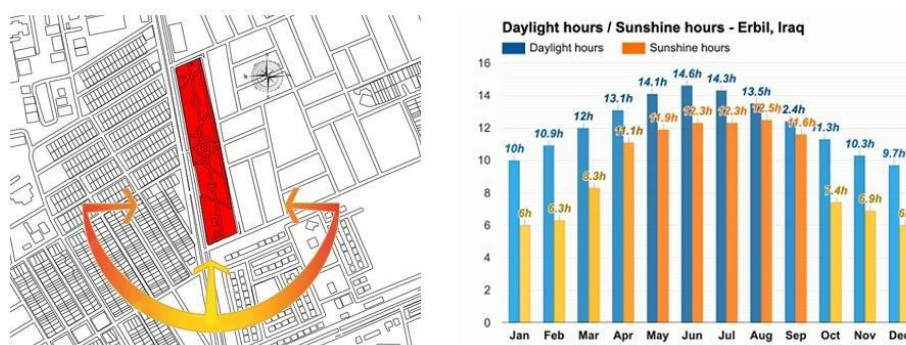


Figure 3: Sun Path and daylight hours analysis in Qutabyan Park, Erbil [15]

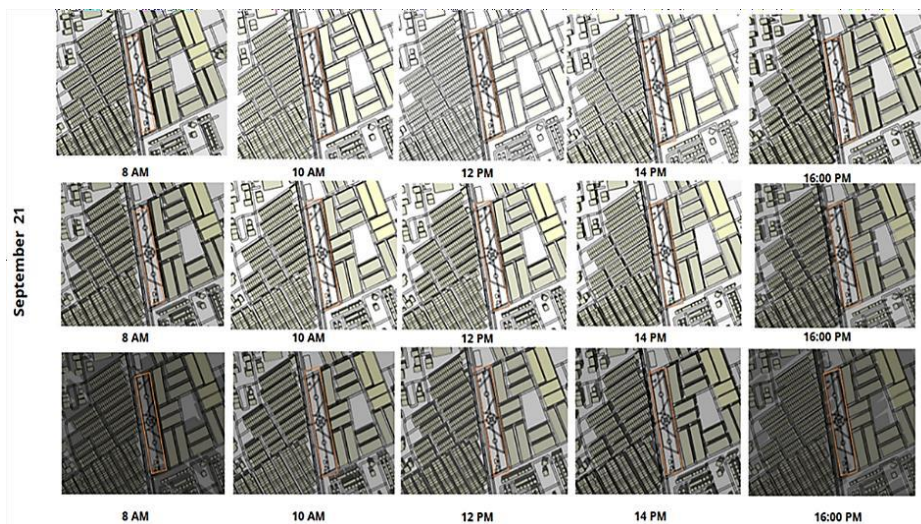


Figure 4: Shadow analysis for Qutabyan Park

2.2.2 Wind Analysis

Wind analysis is considered an essential part of a park design to optimize natural ventilation to create an environment that can be cool, fresh, and comfortable for visitors [11]. Wind analysis of Qutabyan Park as seen in Fig. 5, exposes a design strategy adopting maximum natural ventilation throughout the landscape. It is achieved by graduated tree plantings, from the smallest on the windward side to the tallest toward the interior of the park. Although this itself is likely to adequately steer wind movement, allowing the wind to pass through and ventilate the parking area with ease, this may be quite advantageous, especially during summer periods. This natural air movement, besides helping to maintain a park atmosphere that is cooler overall, is also likely to promote comfort for visitors by reducing the frequency of stale air and thus being more agreeable and refreshing for the outdoor environment.

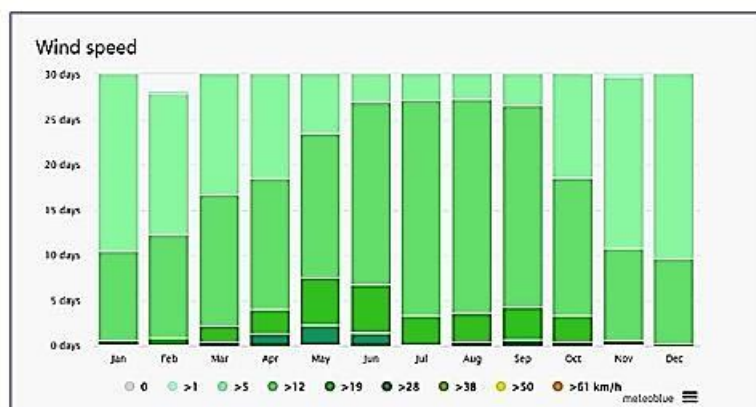


Figure 5: Wind analysis of Qutabyan Park [15]

2.2.3 Noise and Air Pollution Analysis

In a park design, noise and air pollution analysis are fundamental since these are supposed to be quite calm environments. It could help highlight some of the environmental problems and propose remedial action that might involve natural barriers [13]. Site analysis of Qutabyan Park demonstrates that the area is noisy and congested with air pollution on all four sides, as shown in Fig. 6, posing a challenge to maintaining a peaceful and clean environment inside the park. High-density and tall trees around the park will be strategically placed in the design to solve this problem. These natural barriers are bound to be actual noise and air pollution buffers, reducing the infiltration of traffic sounds and

airborne pollutants from roads and urban areas nearby. The tree-lined boundary is meant to minimize noise outside and purify the air that visitors breathe by filtering out particulate matter to create a cleaner and quieter environment for the community.

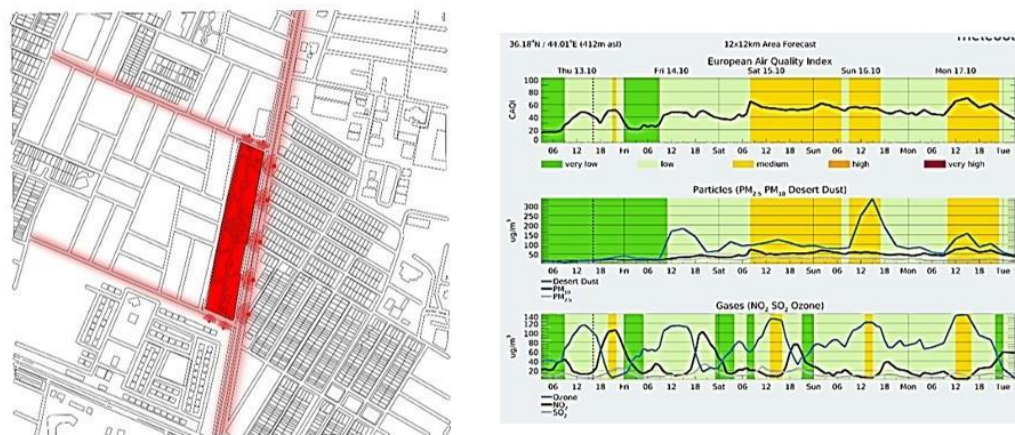


Figure 6: Noise and air pollution analysis of Qutabyan Park [15]

2.2.4 Rain Analysis

Rain analysis is important in understanding the availability of water and, hence, planning sustainable solutions like rainwater recycling to ensure scarce water resources are put to efficient use in landscape design [14]. Rainfall analysis of Qutabyan Park shown in Fig. 7 reveals that Erbil receives relatively low rainfall, especially during winter months, and limited rainfall in general. Considering this scarcity, the need to maximize water-saving efforts for design comes to the fore, and to achieve this, it is planned to integrate the rainwater recycling system application. This system will collect the rainwater, store it, and then use it later to irrigate the landscape of the park so that the vegetation can remain fresh even in arid weather. In this regard, the sustainable approach is intended to create an environment that protects not only the water resource but also supports a resilient landscape that can thrive with minimal rainfall in the region, befitting the environmentally friendly vision of Qutabyan Park.

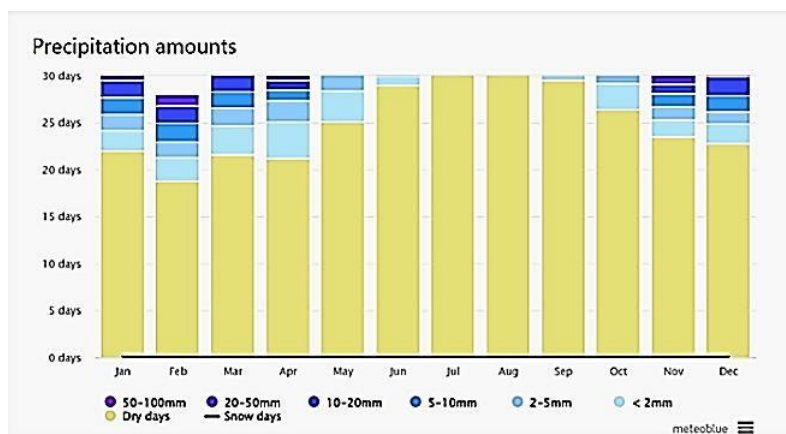


Figure 7: Rainfall analysis of Qutabyan Park [15]

3. Materials and Methods

This work integrates spatial design thinking, observational data, community feedback, and a qualitative design approach. Using AutoCAD, 3Ds Max, and Lumion supported tools, which are grounded in universal design ideas, the conceptual and visual tools supported a user-centred design assessment. Through site visits and informal interviews, community input was gathered with thematic insights guiding zoning, facility placement, and general spatial organization. The design information

and original site plan utilized in this study were obtained from the Kurdistan Region- Iraq Ministry of Planning, Erbil, ensuring that the redesign process was based on accurate and context-specific data.

3.1 Contemporary Design Proposal

The redesign of Qutabyan Park aims to create a vibrant, multifunctional urban space that addresses community needs while enhancing its accessibility, usability, and aesthetic appeal. Therefore, the ultimate mission of this new park design is to be more accessible, inclusive, and aesthetically up to date, with a significant increase in its usability toward enriching the community experience. It focuses on land use in such a way that maximum utilization can be done in catering to the needs of its users in view of the density of buildings and absence of any other green pockets in the neighbourhood. The pavilion anchors the layout of the park while bringing functional and aesthetic value to itself by serving as a communal space for social interaction. Due to the narrow proportions of the site, a longitudinal design was adopted wherein distinct zones and programs were developed, connected through pathways that enable ease of circulation in a comfortable open setting. The design fosters more activation and a sense of belonging by providing different activity spaces within walking distance, thus creating deeper social interactions while transforming Qutabyan Park into a meaningful resilient urban green system.

3.1.1 Design Process

The design process for the redevelopment of the park was systematic in approach since it incorporated universal design principles to create an inclusive, functional, and valued community space. The steps are as follows:

1. Conceptualization: The core concept necessary to ground the project was defining what Universal Design will provide: a developed park to serve users with efficiency and inclusivity. With an understanding that there is generally a deficit in alternative green spaces within the neighbourhood, and the high-rise building density in the surrounding area, the design focus had to be on maximizing the usable area with a balanced approach between active and passive spaces. The pavilion then featured as a central element, acting as a focal point for communal activities and adding value to this park for neighbourly gatherings. This concept diagram, illustrated in Fig. 8 the step-by-step development process of a park design grounded in Universal Design principles to create an inclusive, efficient, and community-oriented space.

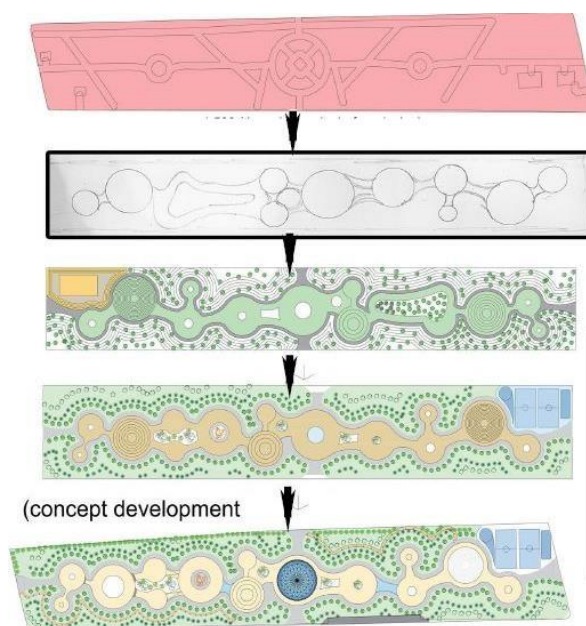


Figure 8: Concept development diagram for the proposed redesign of Qutabyan Park

2. Community Engagement: Valuable community input was very important and helped to shape the design. Responses indicated the need for various recreational and social facilities, areas that would be family-friendly, and the ease of accessible connections between such amenities shown in Fig. 9. This understanding provided the basis for the distribution of the park into circular zones, each with a particular function and created a balanced layout to accommodate diverse activities.



Figure 9: Exterior design 3D views of the seating area in the proposed redesign of Qutabyan Park

3. Zoning and Spatial Organization: The design divided the park into clear zones, with each zone being circumscribed in a well-defined circular area so that maximum accessibility could be granted, as well as sharp boundaries among different areas of activity shown in Fig. 10. For example, the café was situated in the center so it would be equidistant from all parts of the park. The noisier basketball court was put on the edge of the park along the street, reducing noise interference in quieter zones. The playground was also situated near the café to allow parents to watch over their children while staying in the space.

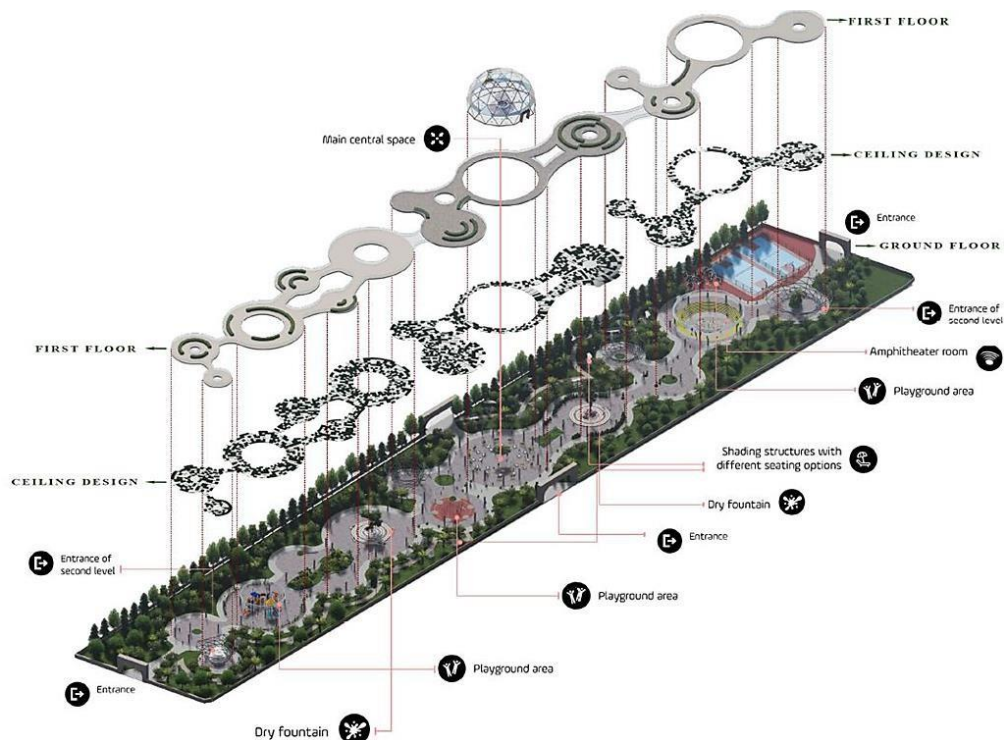


Figure 10: Zoning and spatial organization diagram for the proposed redesign of Qutabyan Park

4. Noise Management and Facility Placement: Noise reduction measures were considered in the spatial arrangement. The design minimizes the noise impact on central areas by placing the basketball court on the outskirts. Larger quiet areas are created, but at the same time, space is left for active recreation.

5. Finalizing the Design: The final design puts a premium on the interrelations among facilities for greater accessibility and user experience. For example, placing restrooms near the playground allows for convenience for families, mainly parents with children. Adapted by design to the narrow shape of the site, the longitudinal layout assures a relaxed, comfortable experience with direct circulation pathways and makes the park user-friendly for all visitors.

3.1.2 Key Features of the Redesign

This is evidenced by the alignment of accessibility, inclusivity, and sustainability as primary values that have been incorporated into development regarding Qutabyan Park redevelopment, all being key spaces within communities and how these roles operate symbiotically with each other. This design relies on an engaging pavilion as a social node for the park, creating more utility–shaded seating areas and dynamic spaces open to varied programmatic use. The park features accessible paths that allow for fluid circulation for all abilities, and inclusive play areas to provide recreational activities for both children and families, as shown in Fig. 11.

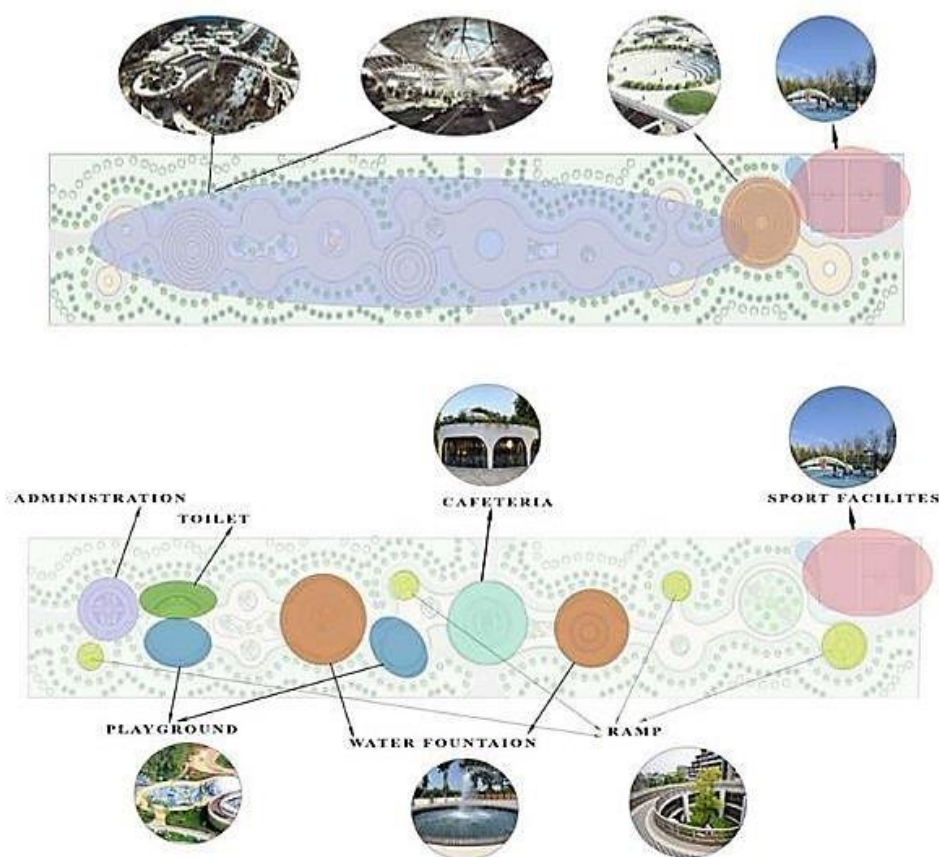


Figure 11: Key features facilities in the proposed redesign of Qutabyan Park

A rainwater-learning and recycling system caters to the landscaping needs of the park while minimizing water waste in the process. Seating areas are placed with care and offer comfortable spots for relaxation, abundant lighting increases safety and obligingly opens the evening atmosphere. Shade-giving trees, native shrubs, and green buffers complete the landscaping that enhances aesthetics and at the same time contributes to cooler parks. This re-imagined park, now known as Qutabyan Park in

conjunction with the redesign of its horticulture and planting, has elevated it to a distinctly contemporary, functional and sustainable green space meeting the diverse needs of the local community.

3.1.3 Integration of Universal Design

Qutabyan Park adopts a universal design principle, which takes care of people across different age bands and diverse abilities to create an inclusive space. Such elements include tactile paving along the way, allowing visually impaired visitors to walk around the park independently and safely. There are ramps dispersed throughout the park, which means that wheelchair users or those with challenges moving around will be able to access all areas smoothly, allowing everyone to experience the full facilities without obstruction. Seating areas offer multiple seating heights, and armrests are available to facilitate a comfortable experience for users across the lifespan and with varying abilities. Based on the premise that their community needs to engage with each other, the central pavilion is a lightweight building where everyone is invited and guaranteed access to seating. These components of universal design integrated into the park help create a space that is inclusive, accessible, and functional for the community across a range of needs.

3.1.4 Visual Representations

Designs on the redesign of Qutabyan Park in most perspectives, 2D and exciting 3D drawings in modern, accessible, safe, and sustainable urban functions: sensitive integration of various forms from a central pavilion type as a focal point at nodes; well-defined, enclosed circular areas for different purpose areas; and the Universal Access path design. Such features as solar-powered lighting, tactile paving, and native landscape plantings are other necessary addenda for increasing usability, aesthetic appeal, and ecological balance within the design. All these representations reflect not just the functional basis of such a design but also, importantly, how it should be park-eloquent, nice, and practically in agreement with the varied users' needs.

The 2D was designed in AutoCAD, as shown in Fig. 12 and Fig. 13, 3D modelling and rendering in 3D Max, and animation in Lumion. Besides, Photoshop was used for the site plan design and site analysis.

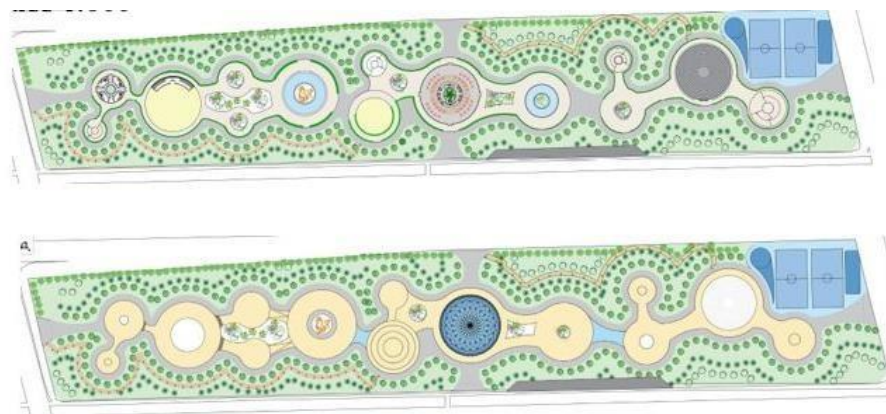


Figure 12: 2D Plans (ground and first level) Proposed Redesign of Qutabyan Park

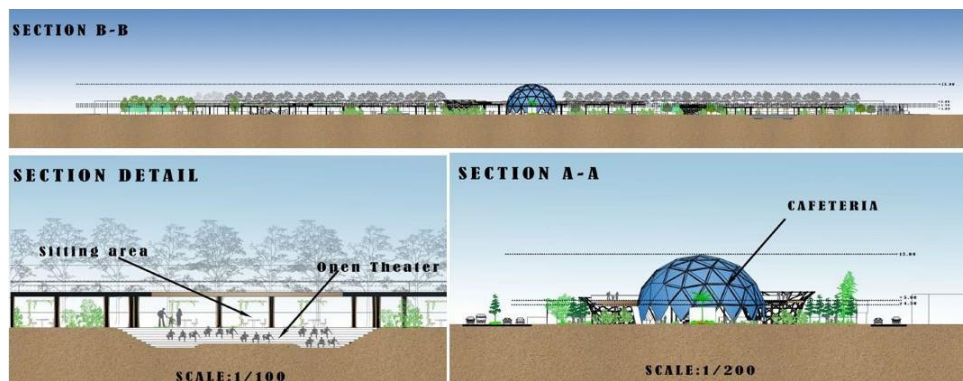


Figure 13: Sections of drawings proposed redesign of Qutabyan Park

With these 3D renders, the new design of Qutabyan Park is given a life-like vision for its upcoming set of developments with a modern, inclusive, and sustainable outlook. These diagrams capture the essence of the design including a centralized pavilion that serves as both an organizational element and a shaded meeting space as shown in Fig. 14.



Figure 14: Interior 3D views from the café zone inside the central pavilion proposed redesign of Qutabyan Park

The circular zones are clearly illustrated in Fig. 15 to embody separate functions, such as encouraging access and usability. Universal design is the driving ethos behind much of the museum's external ambitions, with seamlessly integrated pathways throughout, solar-powered lighting, and tactile paving to assist visually impaired visitors. The landscaping features native plant species, carefully placed to promote biodiversity, while providing natural shade, cooling, and noise reduction. These illustrations not only enhance functionality but also provide a visual improvement, one that is sustainable and grounded, demonstrating how it may be both convenient and approachable, as well as stylish and functional.



Figure 15: Circular zones and general layout for the proposed redesign of Qutabyan Park

3.2 User Experience and Community Benefits

In the redesign of Qutabyan Park, the aim is to create a better and enhanced user experience with a focus on community benefits, inclusivity, and sustainability concerns. Approaches aimed at this

purpose are generally classified into three sections: Enhanced Accessibility, Participation and Inclusivity, and Cultural and Environmental Harmony.

3.2.1 Enhanced Accessibility

The new Qutabyan Park, designed for users of all ages and abilities, has embraced universal design principles. The park has nice paths that all visitors can navigate, including wheelchairs or mobility aids, and families with strollers, as can be seen in the accessibility and circulation diagram shown in Fig. 16. In addition, tactile paving in the park area guides blind visitors to all areas of the park safely and easily, while ramps enable direct access for barrier-free movement. Seating, sanitation, and recreation areas are based on a spectrum of needs; necessary toilets, etc., exist to allow for multi-ability access. Such considerations create a welcoming environment where anybody can walk through the park and utilize its machinery, free from personal charge.

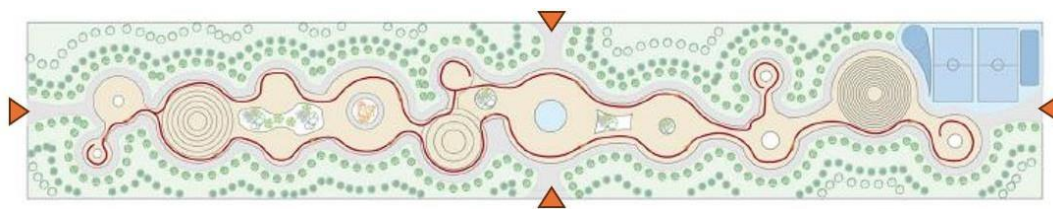


Figure 16: Accessibility and circulation diagram for the proposed redesign of Qutabyan Park

3.2.2 Engagement and Inclusivity

The new park design promotes activity with places to congregate and spaces for people to come together and engage as a community. A central pavilion, as shown in Fig. 17, with shaded spaces and adaptable seating for social events and community programs, is home to the region's open-kitchen cooking school and other activities in a busy schedule of family picnics. Distinct circular areas designate various activities and spaces for people of all backgrounds to congregate - whether engaging in high-octane sports or relaxation. This organization enriches the park's role as a social center and engenders community identity among visitors - students, families, or the general local populace.



Figure 17: Central pavilion with shaded spaces 3d views for the proposed redesign of Qutabyan Park

3.2.3 Cultural and Environmental Harmony

Another aspect of the park design is the recognition of local culture in Erbil. The park assimilates local aesthetic and cultural identity through locally sourced materials and regionally inspired architectural features. Moreover, elements of environmental sustainability - like a rainwater harvesting system, native plants, and shade trees that help achieve naturally cooler temperatures and cleaner air - increase local biodiversity, save water, and lead to more livable neighbourhoods.

As shown in Fig. 18, the inclusion of green roofs and shaded pathways in the park will be indicative of the environmental sustainability of the park by minimising heat islands and improving air quality. Native plant species with shaded areas will be complemented by water-efficient landscape design with rainwater harvesting strategies. The incorporation of public seating areas along with play zones

encourages community interaction, hence cultural and social connectivity while reflecting the local identity of Erbil.



Figure 18: Native plant species with shaded areas, 3D views, proposed redesign of Qutabyan Park

4. Result and Key Findings

A substantial amount of information has been gained due to the analyses that have been carried out, and efforts have been made to improve the design to make it more functional and eco-friendlier. The following is a summary of the key findings that were identified due to these investigations.

- The study identifies key issues such as a lack of amenities, access, and degradation of the natural environment, and proposes solutions such as accessible paths, shaded seating areas, and multi-generational play areas that cater to all ages and abilities.
- The current park design has several issues, including accessibility challenges, environmental degradation, and a lack of community engagement. The redesign aims to address these issues by incorporating universal design principles, sustainable elements, and community engagement.
- The redesigned park features circular zones for separate functions, universal design principles, pathways for accessibility, solar-powered lighting, tactile paving, native plant species, and rainwater harvesting systems.
- Qutabyan Park's redesign within these definitions could show how the power of universal design can change the form and shape of urban landscapes, cultivate an inclusive culture by changing spatial enforcements to the enrollment of locality
- It is a project that will breathe life into this park and give an example of what urban design needs to do in this city, and be used elsewhere: imaginative, anthropocentric, sustainable, socially inclusive, all while renewing positive population dynamics. These should be manifested in public spaces, with a character and identity that attract people to gather for recreation and commerce alike, all leading to open areas that provide the social connectivity required for a healthy urban environment, which is a key ingredient of the vibrant, resilient and equitable city

A comparison of Table 1 has been made based on the conditions before and after, to emphasize the transformation that took place from the previous state of the park to the redesigned one. It focuses on the redesigning of Qutabyan Park, taking into account architectural and landscape features. Rather, the park had serious problems, such as impermissible accessibility, a cluster of poorly equipped territories, and a low number of plants, as well as no green policies. The new proposal redresses these problems effectively by applying principles of universal design and improving convenience through tactile paving and ramps. Moreover, rainwater harvesting systems and solar lights were incorporated into the

design. More so, the combination of dense native plants, intergenerational play spaces, and a main pavilion increases biodiversity, function, and interaction within the area. These adjustments make not only the operation of the park more efficient but also allow for the establishment of a Cultured environment protection zone, and sociable surroundings with a distinct character.

Table 1: Comparative analysis of Qutabyan Park before and after redesign

Aspect	Before Redesign	After Redesign
Accessibility	Limited accessibility with uneven pavements and poorly connected facilities.	Universal design principles are applied, with tactile paving, ramps, and accessible paths for all abilities.
Amenities	Insufficient and poorly maintained amenities, such as damaged benches and non-functional fountains.	Enhanced amenities include shaded seating areas, improved playgrounds, and functional sports equipment.
Play Areas	Only one undersized and poorly maintained playground.	Inclusive and multi-generational play areas for diverse age groups.
Vegetation	Sparse vegetation is insufficient to provide shade or biodiversity.	Dense tree planting and native landscaping to improve shade, aesthetics, and biodiversity.
Water Management	No sustainable water management systems; poor drainage.	Introduction of rainwater harvesting systems for irrigation and reduced water wastage.
Lighting	Limited and outdated lighting systems.	Solar-powered, energy-efficient lighting to enhance safety and usability in the evenings.
Noise and Air Pollution	No barriers to mitigate noise and air pollution from nearby roads.	High-density tree buffers reduce noise and air pollution, creating a quieter and cleaner environment.
Social Spaces	Lack of communal spaces; limited opportunities for social interaction.	A central pavilion and designated activity zones to encourage social gatherings and community interaction.
Design Layout	Fragmented and uncoordinated layout with disconnected features.	Longitudinal design with clear zoning, enabling easy navigation and a cohesive park experience.

5. Conclusion

The Qutabyan Park's redesign within these definitions could show how the power of universal design can change the form and shape of urban landscapes, cultivate an inclusive culture by changing spatial enforcements to enrollment of locality. In addressing past accessibility issues, the intervention merges spaces for recreation with sustainable elements such as rainwater harvesting and solar lighting in an overall built environment that is largely accessible, to become a 21st-century public space marker able to accommodate multiple users. Wide trails, shade, sitting areas, and landscaping with trees that denote sustainability here make its elements more feasible for the use of the park while balancing it against nature. It is a project that will breathe life into this park and give an example of what urban design needs to do in this city, and be used elsewhere: imaginative, anthropocentric, sustainable, socially inclusive all while renewing positive population dynamics. These should also be manifested in public spaces, with a character and identity that attract people to gather for recreation and commerce alike, all leading to open areas that provide the social connectivity required for a healthy urban environment, which is a key ingredient of the vibrant, resilient, and equitable city.

Authors' contribution

The authors contributed equally to this work, from the implementation and design of the research to the analysis of the results and the writing of the manuscript.

Conflict of interest

The authors have no financial or proprietary interest in any material discussed in this article.

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