

Received 20 February 2019; accepted 29 May 2019.

Available online 1 July 2019

Towards Better Cities: Improving Walkability in Terms of Seven Principles.

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ABSTRACT

Walking has always been one of the basic transportation techniques in the world. In the middle of the second half of the 20th century, automatic methods were developed, especially private cars. A state of excessive dependence on mechanical transportation has been advanced. More recently, the idea of revitalizing walking as one of the urban mobility ways has begun to increase. Both research and practice work is currently looking for ways of urban rehabilitation to encourage people to go walking and cycling. Indeed walkability is essential in implementing sustainable urban planning; it helps to connect the community while providing alternatives to automotive transport. Walkability has been studied on various levels, various places, and with regards to concepts and factors. Thus this paper aims to study walkability by answering four questions: what, why, how, and where? In other words, what is walkability? Why is it beneficial? How could it be implemented in terms of rehabilitation of urban areas? And where is it used? Considering a presented case study in San Francisco, U.S.A, and another one in Sheikh Zayed, Egypt. The study investigates some key principles that may help improve walkability in communities. The results stress the implementation of seven key principles that guarantee the success of walking and its positive impacts in urban areas.

KEYWORDS

Walkability, Rehabilitation, Urban Areas, Pedestrians, the Seven Principles.

INTRODUCTION

Before autos and bikes, walking has been the fundamental method to travel. For a long time, walking was the most ideal way of moving (Rich, N., 2015). The economic development during the 1930s incited extended car fabrication (Hendee, C., 2014). The adverse impacts of car outflows before long prompted open worry over contamination.

Walking and cycling facilities help make cities and towns more livable and support tourism (NLTP 2018). Walking is often defined as a type of sustainable transport. It has many benefits on many levels such as health, sustainability, social and economic benefits. Although walking represents a vital issue, it's still looking for ways of urban rehabilitation to encourage people to go walking and cycling.

One of the relevant key factors to the declination of walking is the change in the urban environment of urban communities (Rafiemanzelat, R., et.al., 2017). Also, many reasons could be responsible as follows:

- Missing pathways
- Low quality of walking surfaces

- The absence of pathway maintenance
- Expanded separation forced by street formats, barriers, footbridges, and subways
- Lack of continuous signing to potential destinations
- Lack of continuous pedestrian routes
- Low-quality lighting
- Speeding traffic
- Lack of rest areas and seating
- Traffic noise
- Lack of shade
- Lack of shelter from inclement weather
- Lack of interesting features on the route. (NZ Transport Agency, 2009)

The expanding absence of physical movement among all populaces has been viewed as a worldwide public health issue. The built environment has been identified as an essential factor for integrating physical activity into one's daily life. The World Health Organization (WHO) has called for changes in the built environment in order to enhance human wellbeing, walkability, transportation, and recreational amenities. (Zuniga-Teran, et.al., 2017)

For a long time; the simple act of walking was neglected by city planners, regardless of how people get around their cities. Thereafter, some global urban communities have made incredible steps such as the public squares program of New York and Paris, the pedestrianizing of real roads of Striges in Copenhagen, London's Oxford Road, and Madrid's Gran Vía. (Laker, L, 2017).

Nowadays communities need to implement plans to improve walkability. According to Southworth; some criteria such as connectivity, quality of the path, safety, and context are essential to improve walkability. (Lawlor, M., 2015)

In other words, the successful ecological system of a place makes it walkable. Walkability cannot be improved without a real vision of urban problems. Walkability requires a sort of rehabilitation of urban areas that deals with density and mix use of lands, an orientation of masses and buildings, safety in streets, accessibility of transit, and a connection between urban areas. (Zayed, M. A., 2016)

One of the leading examples in enhancing walkability in urban areas is the work of SPUR." (SPUR) is San Francisco Planning and Urban Research Association; a member-supported non-profit organization. In 2013 SPUR has released a policy report titled "Getting to Great Places", this report went for enhancing the urban plan nature of new development in San Jose, California. SPUR worked to support the successful implementation of what San Jose tried to reach; her dream of new urbanism oriented to the pedestrian. Although the report is gone for San Jose, the issues it handles are pertinent to numerous urban communities (Joh, K., et.al., 2015).

SPUR has provided seven rules that help to improve urban areas and encourage urban planners and developers to promote walkability. The report represents a guide for cities to enhance public areas and make it more appropriate for pedestrian mobility (Spur, 2013).

The paper presents a study based on SPUR's work. The study admits the seven rules as key principles and considers them as mandates for improving walkability. The paper integrates between the theoretical, applied, and analytical study. The theoretical study tends to identify the concept of walkability, its benefits, and the key principles

to improve it. Followed by an applied study of Mueller Town Center, Austin, Texas in San Francisco, an analysis is provided and a conclusion of rehabilitation of the city in terms of the key principles provided by SPUR. Then the paper provides some important recommendations to improve walkability in urban areas.

1. WALKABILITY: DEFINITIONS AND FACTORS AFFECTING

Walkability as an idea; has been introduced by urban planners at the beginning of the nineties, focusing on the basics of the urban context and the elements affecting walkability. It has been described in various terms and attributed by various factors and estimations. (Rafiemanzelat, R., et.al., 2017)

Merriam Webster Learner's Dictionary stated that the word "walkability" means "suitable for walking". (Refaat, M. H, Kafafy, N. A., 2014)

According to Southworth definition; walkability is: "The extent to which the built environment supports and encourages walking, by providing pedestrians comfort and safety, connecting them with varied destinations within a reasonable amount of time and effort, and offering visual interest in journeys throughout the network".

Another definition provided by Zook et al. "The opportunity for continuous movement across some distance and hence, engages both the local and global street networks".

Walking is the ability for individuals to travel on foot without the need for an automobile in a safe manner. It must protect pedestrians, and this could be achieved by proper planning of walking paths and know how to connect walking to residents, businesses, and local communities. (Lawlor, M., 2015)

As per Burden, walkability is "the extent to which the built environment is friendly to the presence of people walking, living, shopping, visiting, enjoying or spending time in an area". (Rafiemanzelat, R., et.al., 2017) Meanwhile (NZ transport organization, 2009) gave a clearer definition, "A pedestrian is a person on foot, or in or on a contrivance equipped with wheels or revolving runners that are [sic] not a vehicle. This can include an able pedestrian, a person pushing a pram, a person on a skateboard, a person in a wheelchair, and a number of other users." (Benjamin, G., 2013). (NZ Transport Agency, 2009) moreover described the primary characteristics of walkable communities as they are: connected, legible, comfortable, convenient, pleasant, safe, secure, universal, and accessible.

Walkability is a vital issue in the community, it provides easy access to the transportation network for a different range of community members such as; young, old, children, and people with disabilities. Walking and walkable areas can support many functions including community involvement, health, social gathering, and recreational activities which positively affect sustainability and vice versa.

In 2004 a research titled "Making London as walkable city" defined walkability as "the extent which walking is readily available to the consumer as a safe, connected, and pleasant activity". The research stated, that the main features of the walkable city are to be: Connected, Pleasant, Obvious, Agreeable, and Advantageous. (Rafiemanzelat, R., et.al., 2017)

Factors affecting walkability include, but are not limited to Street connectivity, Land use mix, residential density, the presence of trees and vegetation, frequency and

variety of buildings, road plans that work for individuals and retail areas. (Singh, R., 2016)

Walkability depends on the context. According to Reid Ewing and Robert Cervero's; a territory's walkability is impacted by five D's: density, diversity, design, destination accessibility, and distance to transit, which all affect the Walker option for walking. (Ewing 2010; Refaat, M. H, Kafafy, N. A., 2014) Walkability could measure the ability of an area to welcome walking, it is an imperative idea for urban sustainability. (Refaat, M. H, Kafafy, N. A., 2014) Consequently, it may be reasoned that the term walkability alludes to the dimension that an urban setting urges its occupants to walk while going through it. It is a need that the new urbanism development target creating walkable conditions.

1.2 Advantages of Walkability Urbanism

As indicated by different researchers, walkability affects positively the wellbeing, increase the social interaction, the economic activities, and the safety feeling for inhabitants (Rafiemanzelat, R., et.al., 2017). The advantages of walkable urbanism may include:

1.2.1 Healthy community

Walking has always been viewed as one of the least demanding and low-cost physical exercises. Therefore, it has an essential role in diminishing high blood pressure, heart attacks, and depression (Singh 2016). As per the Center for Disease Control and Prevention (CDC), walking about 30-minutes daily helps minimize fatness. Thus community can encourage walking and offer its inhabitants 30 minutes of physical activity each day (Rafiemanzelat, R., et.al., 2017). As per The World Malignant growth, Exploration Reserve, and American Establishment for Disease Exploration report; walking can diminish cancer (Ewing, R. Cervero, R., 2010).

1.2.2 Sustainable environment

Some urban advantages could be accomplished by embracing walking as a method of mobility for short distances. The fundamental advantages are minimizing both traffic blockage and vehicle parking, which as well may reduce the cost of street maintenance and traffic amenities (Singh, R., 2016). Walkability decreases the automobile footprint in the community, thus if a bigger number of individuals walk instead of driving or using any other transportation; carbon emissions could be reduced.

1.2.3 Social and economic advantages

It has been discovered that walkability is related to the rise of financial estimation of workplaces, retail organizations, and houses. On the social side, walking improves social communication and security as it implies the presence of individuals in open spaces and roads of the urban context. A walkable community is vital; it gives a sense of comfort and enhances the sense of community (Singh, R., 2016).

Walkability also could increase the efficiency of land use (Wang, K, 2013; Zayed, M. A., 2016). In a walkable city, social interaction increases due to the mixing of populations, whereas, the rate of crime reduces as individuals walk in open spaces and avenues (Hitti, M., 2009).

1.2.4 Better quality of life

Walking can modify human mood and enhance personal satisfaction. The residents in a walkable community belong to their community and feel more their uniqueness and identity (Rafiemanzelat, R., et.al., 2017).

1.2.5 Safe environment

Walkability help to expand the number of walkers making an alarm for drivers to see the walkers more than before. Other methods of increasing safety include slowing traffic in residential neighborhoods and near schools, maintaining safe walkways separate from the road, providing ample, well-designed crosswalks, and teaching children to cross the street safely (Rafiemanzelat, R., et.al., 2017).

2. KEY PRINCIPLES TO IMPROVE WALKABILITY

In his paper, "Designing the Walkable City", Professor Michael Southworth of UC Berkeley described several criteria to implement plans for walkability within urban planning. Southworth outlined the following criteria: connectivity, quality of the path, safety and context. Connectivity of the path network could be determined by the presence of sidewalks and other pedestrian paths and by the degree of path continuity and absence of significant barriers. The ideal pedestrian path will provide comfort and safety for pedestrians of varied ages and physical abilities.

As for context; Southworth (2005) describes path context as the "visual interest of the built environment, the design of the street as a whole, transparency of fronting structures, a visible activity, street trees, and other landscape elements, lighting and views" (Lawler, M., 2015)

(NZ Transport Agency, 2009) declared a synopsis of 4 Concepts for improving the pedestrian environment, which is; living streets, pedestrian precincts, shared zones, and sharing the main street.

Living Streets: The idea of 'living streets' perceives that, as a need, lanes ought to be structured with living and network collaboration. While vehicles are not rejected, they are planned so drivers know they are in a region where a person on foot and different clients are imperative. A living road intends to adjust the necessities of occupants, organizations, people on foot and cyclists with vehicles, and accordingly empower a superior personal satisfaction and a more noteworthy scope of network and road movement.

Pedestrian Precincts: Pedestrian precincts are pedestrian-only areas. They are created by limiting traffic access or closing roads to traffic. They are most useful where there are a lot of activities provided for pedestrian, retail or mixed development. It requires continued maintenance. It could be allowed to have delivery vehicles during the early morning or evening, but also could be prohibited completely based on the maintenance system. Furthermore, public transport could be permitted within a narrow corridor. But cyclists are usually welcomed and parking lots are extra needed.


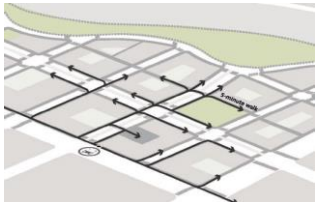
Shared Zones: A shared zone is a street designed to serve pedestrians and residents while minimizing vehicle use. It is a residential or retail street that still allows vehicle service but in a limited way by landscape design elements to slow the vehicles speed.

Sharing the Main Street: Sharing the main street is to adjust it to improve the safety and the quality of the road environment for all kinds of users. Users of the main street have various needs such as crossing safer for pedestrians, the ability to park for visitors, and attracting customers for the business.

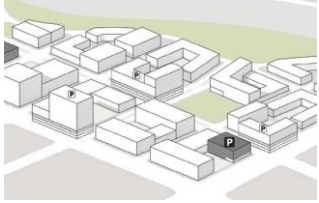




As mentioned in the introduction; SPUR's report went for enhancing the urban plan nature of new development in San Jose, California. SPUR has provided seven rules that help to improve urban areas and encourage urban planners and developers to promote walkability. The report represents a guide for cities to enhance public areas and make them more appropriate for pedestrian mobility (Spur, 2013)

The following table represents an abstract for the seven key principles to improve walkability, how to be accomplished and what are the lessons learned from this implementation.

Table (1) Key principles to improve walkability.

Key Principles to improve Walkability	How to be accomplished	Lessons Learned
<p>1.Establish good circulation for pedestrian</p> <p>A walk fixed with shops and bistros turns out to be much pleasant. It's about visualizing the distance. Urban areas ought to abstain from taking up non-porous and massive walls and divide the streets into smaller pieces. Walkway bistros help to empower the walker's investigation.</p> 	<ul style="list-style-type: none"> - Constructing small buildings. - Giving accessibility between buildings through public spaces, tracks, and pedestrian paths along with crossed roads. - An exceptional standard rule is that walkers feel comfortable when a track option is provided once per minute, which varying from 200 to 300 feet in the center of the city. 	<p>The creation of a delicate granular circulation; gives a visual intrigue and a feeling of advancement where new structures and crossing points are reflected with reasonable frequency, not only allowing individual access efficiently.</p> 
<p>2. Direct buildings towards streets and open spaces.</p> <p>In urban areas where it is walking is possible, buildings are set on the outskirts of the roads and open places, not behind the parking lot or green spaces. These</p>	<ul style="list-style-type: none"> - Finding the main entrance directly on the walkway, urging people on foot to venture in. -Putting structures in the city implies comfort and feeling of security. 	<p>When putting parking in front of buildings, walkers get the message that they are of optional significance. They feel isolated from uses and activities, forced to walk greater distances.</p>

<p>integrated edges give a feeling of definition and differentiation for roads, which helps to make the environment more clear and consistent. Building entrances are on or alongside walkways.</p>	<ul style="list-style-type: none"> - Make short setbacks just to give open spaces or progress from the public to private. - Loading docks, passages, and garages ought to be small and constrained in order to not disturb walkers 	
<p>3. Having city centers to support community activities.</p> <p>It is better for cities to have centers where people can spend time. A decent harmony between dynamic spaces and retail outlets is needed. Community meeting space such as gym, an outdoor climbing wall can make the outdoor areas more vital.</p>  <p>Mission playground provides adults also kids to meet in one of San Francisco's densely populated neighborhoods.</p>	<ul style="list-style-type: none"> -Economic places like stores and event areas should be located near walker roads to encourage people to communicate. -Verified areas should be located away from public streets. -Private doorways ought to be intended to give an effortless change from open to private. -Points of access to certain uses like garages and cinemas could be major nodes of activity, while they are tucked deeply away. - Utility spaces ought to be not seen for walkers, also stacking spaces. 	<p>The way users are using an area has a major impact on the activity, vitality, security, and identity of surrounding streets and open areas.</p> 
<p>4. Parking lots should be underground or behind structures.</p> <p>Good places for people on a large extent depend on the place of parking. Parking is expensive, unattractive, it is important for drivers and represents a financial resource. They should be provided in multilayer structures placed in the uninterrupted pedestrian area.</p>	<ul style="list-style-type: none"> -Putting parking lots underground or behind a building. -A well designed large underground parking lot could help the community to be walkable and vibrant. -Finding the right balance for parking across multiple use cases (commercial, office, residential). 	<p>The pedestrian feels like a second-class citizen when a building is put behind a parking lot.</p> <p>Well-designed garages can serve multiple buildings, allow parking to be managed efficiently and draw people onto the streets. After parking their cars each driver becomes a walker.</p>

	<p>-Pedestrian garage exits should be located to support public spaces.</p> <p>-Ensure that the entrance and exit of vehicles and walkers are coherent and advantageous.</p>	
<p>5. Meet the human scale with masses and urban elements.</p> <p>Walkers can feel the urban context at the size of their own body space.</p>  <p>The front of The Empire State Building in New York. This facade is scaled to welcome walkers.</p>	<p>-Buildings should meet and communicate with people in their bodies, with trees in the streets, small signs, entrances, facade components, and lighting.</p> <p>- Separation and subdivision of structures into a group.</p>	<p>Successful signals can make things communicate with the human level, even massive structures that can reach the human scale in a satisfactory way.</p> 
<p>6. Cleanness and continuity of pedestrian walkways.</p> <p>Large walkways are the connective tissue of the city, including trees, lighting, and road furniture.</p>  <p>Grand Place in Brussels, maintains its importance among visitors and locals, staying as bystanders and agrees with many bars and shops.</p>	<p>Walkways should be associated with safe road intersections, likewise, it ought to be coordinated with building doorways, travel offices, courts, and stops.</p> <p>-Easy ways to move through plazas, parks, and other places should be available for the pedestrian.</p> <p>- The signs are important, especially for densely populated areas, to explain how to navigate.</p>	<p>The continuity of pedestrian access among major uses and amenities, including transit facilities, is essential so that people feel comfortable when walking.</p> 
<p>7. Provide complete street</p>	<p>A street is complete when considers both the right of the public road and the use</p>	<p>Lanes can oblige movement modes, destinations of trade, green spaces, and go</p>

<p>A street that provides a protected, agreeable, appealing and advantageous access and travel for walkers, bicyclists, drivers, and everything being equal such as capacities, and inclinations is a complete street.</p>	<p>of the land and the design of the neighboring properties, including the height of the appropriate buildings and the planning for the use of the neighboring lands that actively participate in the public street activities.</p>	<p>far towards advancing an area.</p>
	<p>-Streets for vehicles should distribute space securely between private vehicles, travel, bikes, and ought to be not greater than it should be expected for their capacity.</p>	<p>Small streets can restrain vehicular rates and limit in different capacities, from conveyances to social movements.</p>
<p>Alameda de León in Oaxaca shows Mexico the idea of "Complete streets"</p>		

Source: data adapted from Spur report 2013

3. CASE STUDY: Mueller Town Center, Austin, Texas.

The following case study has been selected as it represents a successful implementation of urban rehabilitation in order to make an area more walkable and design a sustainable community.

3.1 Designers

ELS Architecture and Urban Design, ROMA Design Group, McCann Adams Studio.

3.2 The Project's Background

Mueller is located in Austin, Texas. Robert Mueller Municipal Airport represents for 70 years a big problem and a void in the urban fabric of East Austin.

The project is an open private redevelopment of the previous Robert Mueller Metropolitan Airplane terminal. The project has been designed to implement the principles of new urbanism which aim to minimize driving and give residents the opportunity to walk easily to vital services. The open spaces and buildings have been arranged to give the feeling of community closeness.

Mueller Town Center is a sustainable design mix-use district that incorporates, provincial and national retail, eatery and stimulation inhabitants, and highlights multifamily lodging, office, and exhibition hall employments.

The project earned LEED for Neighborhood Improvement (LEED-ND) for its reconciliation of the standards of shrewd development, urbanism, and green building. Mueller's program of "Green Urbanism" advances manageability at three particular dimensions: green community design, green buildings, and green infrastructure.

Mueller is perceived for its promise to environmental sustainability including green spaces that represent 20 percent of the site.

Figure (1) Mueller Town Center



Source: Spur, 2013

3.3 Analysis of the Rehabilitation of Mueller

The rehabilitation of Mueller provided a good development for the community after years of deterioration. It transformed the city into a livable area, mixed-use places, walkable streets and, downtown center.

The analysis of the case study is based on the seven principles adapted from SPUR's report as urban design fundamentals for improving walkability.

1. Establish good circulation for pedestrian

The project provided open spaces designed to make walkability more comfortable, an interconnection system between the open spaces, and pedestrian ways while encompassing parks and neighborhoods.

Figure (2) Mueller Town Center



Source: Spur, 2013

2. Direct buildings towards streets and open spaces.

The neighborhoods intended to be neighborly, with a good street orientation, with patios and passages that give "eyes in the city" and advance connection and socialization among occupants, strengthening the passerby scale and character of the network.

Figure (3) Mueller Town Center

Source: Spur, 2013

3. Having city centers to support community activities

Town center district provided a focal point for the new plan and the neighborhoods on a social, cultural and economic level. The setup and structure of the Town Center Region depend on a few key criteria: character, availability, walkability, comfort, assorted variety, and validness.

The Town Center District encompassed three building types: “Aldrich Street and Paseo Buildings” which give the most serious convergence of retail utilize which activate road and walker promenades; “Mixed-Use Buildings” which incorporate a scope of office and residential complexes; and “Parking Buildings”.

The street has been designed to have the following attributes:

- A consistent facing of retail, eatery or passerby arranged utilizations along the road.
- Projecting shelters, pergolas and overhangs as well as arcades and corridors that give spread and shade.
- Multiple building bundles with to advance decent variety, intrigue, and a fine-grained character.
- Upper-level uses, including living arrangements and business, uses that give an extra force of action.
- Parking that is either compositionally typified inside the building as well as situated in one of the Town Center Locale's shared offices.

The Mixed-Use Buildings shared the following attributes:

- Buildings work to or close to the front property line to give a solid spatial definition to the boulevards.
- Ground-level uses incorporate retail shops, workplaces, the community utilizes as well as private units situated along the road to reinforce the pedestrian character of the street.
- Parking incorporated inside the building complex or given in concentrated off-site.
- Outdoor space, including patios, paseos, galleries, porches, and greenery enclosures are extending the streets and providing gathering areas.

Figure (4). Mueller Town Center

Source: Spur, 2013

4. Parking should be underground or behind structures.

As mentioned before, there were independent buildings for parking. "Independent" parking structures are arranged inside the town center area to advance shared stopping among an assortment of employment, where guests can helpfully stop and visit various destinations.

Figure (5) Mueller Town Center

Source: Spur, 2013

5. Meet the human scale with masses and urban elements.

The project provided an appropriate scale of masses that met and communicated with people, trees, signs, entrances, facade components, lighting.

Figure (6) Mueller Town Center

Source: Spur, 2013

6. Clearness and continuity of pedestrian walkways.

Streets intended to provide appropriate traffic in a way that limits the impact on contiguous networks. They fill in an augmentation of the open space, giving the community a character. As for transit; an extensive program went for decreasing depending on a car.

Figure (7) Mueller Town Center

Source: Spur, 2013

7. Provide complete streets

Streets provided distributed spaces between private vehicles, travel, and bikes in a secure way.

Figure (8) Mueller Town Center

Source: Spur, 2013

3.2 Beverly Hills Compound - Sheikh Zayied, Egypt

The following case study has been selected as it represents an example of Egyptian compound designed to contain a large green areas and activities giving the opportunity to the residents to walk.

3.2.1 Designers

Beverly Hills Property management

3.2.2 The Project's Background

Beverly Hills was one of the first large residential complexes to be developed in Sheikh Zayed City, just off the Cairo-Alexandria desert road. Beverly Hills has become a comfortable and vibrant community and has become a coveted address in west Cairo. Beverly Hills, the first SODIC project, is a mixed-use residential and commercial project of 1.75 million square meters with revenues of more than one billion pounds.

Beverly Hills was delivered in 2001 with more than 3,000 luxury villas, townhouses and apartments surrounded by a large landscaped garden, gardens with wide streets and extensive bike paths in all streets.

Figure (9) Beverly Hills' Layout

Source: <http://www.beverlyhillsegyp.com>

3.2.3 Application of Seven PRINCIPLES

1. Establish good circulation for pedestrian

The photos show a good circulation in general, it is not always oriented to pedestrian but the roads are large and comfortable allowing people to walk and use the open spaces.

Figure (10) Beverly Hills' roads and circulation

Source: Author

2. Direct buildings towards streets and open spaces.

Not all the compound designed to direct buildings towards courts, but a big sector such as "La Casa" is designed in an introverted way giving a good opportunity of socialization and connection. Also the shaded areas due to this design invite pedestrian to go out and walk.

Figure (11) Beverly Hills. Direction of building towards courts and streets.

Source: Author

3. Having city centers to support community activities

The compound is designed to contain different levels of community activities taking the form of city center such “The HUB”, or commercial streets containing some shops and a parking for cars.

Figure (12) Beverly Hills’ Hub and centers



Source: Author

4. Parking should be underground or behind structures.

The parking areas are always available in this compound either in behind the building or underground.

Figure (13) Beverly Hills. Services roads and parking shades



Source: Author

5. Meet the human scale with masses and urban elements.

The project provided an appropriate scale of masses that met and communicated with people, trees, signs, entrances, facade components, lighting.

Figure (14) Beverly Hills. Scale of masses



Source: Author

6. Clearness and continuity of pedestrian walkways.

Streets intended to provide appropriate traffic in a way that limits the impact on contiguous networks.

Figure (15) Beverly Hills. Clear walkways



Source: Author

7. Provide complete streets

Streets provided distributed spaces between private vehicles, travel, and bikes in a secure way. A lot of parking for bikes is available in a good percentage.

Figure (16) Beverly Hills. Streets for cars and parking for bicycles.



Source: Author

4. CONCLUSIONS

Although Walkability is a basic mean of mobility, nowadays it becomes an urban function, a real need, and a lifestyle. From this work, the following points are concluded:

1. There are essential factors affecting areas to be more walkable:
 - A center: an area designed to be walkable needs a center.
 - People: they are essential for frequent enrichment and public transportation; enough people are required.
 - Mixed use: the houses must be located close to the companies, not in separate areas to give people the chance to work and use the facilities.
 - Parks and open spaces: open areas are highly needed for assembling, accumulating, and playing.
 - Walkable approach: buildings need to be close to roads and parking should be located underground.
 - Schools and working environments: should be designed in a way that the inhabitants can go to them walking easily.
 - Complete streets: streets should serve and secure cyclists, pedestrians, and transit.
2. Walkability is not always standing alone as a single objective; nevertheless, it could be a natural result of a rehabilitation process a deteriorated area.

3. Many lessons could be learned to improve walkability:

-Streets design should help in slowing car traffic and enhancing the walkers' experience.

-Wide walkways and road trees are highly needed for shading especially in hot arid areas.

-Open spaces need a sort of diversity and connection to be more inviting for pedestrians.

-A spine for walkers to connect places may encourage walking and minimize the dependence on cars.

-An interesting and beautiful node could be a place for community festivals.

-Artful design can minimize the impact of automobiles, even when the parking is abundant.

5. RECOMMENDATIONS

There are several suggestions that could be implemented in order to improve walkability conditions:

1. Municipalities should pay attention to specify a whole street for walking and make the necessary publicity for it; and this is in order to develop economic activities, public health, and social communication, taking into consideration the appropriate size of the street in relevant to the assembly degree.
2. To develop a design guide that helps to enhance the performance of vital streets including elements and walking conditions.
3. To hold a series of training courses for planners; these courses aim to define street design requirements and how to develop walking performance.
4. A kind of public competition is needed to develop a range of selected streets in order to achieve the best design and performance for walking.
5. To encourage social participation in designing proposed streets and areas.

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