Questioning Legibility at Street Scale: The Case of Ismet Inonu Boulevard in Gazimagusa

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ABSTRACT

Well-designed public open spaces such as streets, squares and parks play a central role in making a place livable as they act as motors of social interaction; creating a ground for people to come together in the cities. Amongst these public spaces, streets tend to play a significant role in people's lives as they both act as channels for transportation and also a medium for social interaction. It is this dual function that makes streets a common research focus for academics. In order to create successful streets that do not only serve for motorized transportation but act as an interactive ground for people, it is vital to have legible streets which are visually and physically attractive as well as graspable so that people can easily orient themselves.

Within this perspective, the thesis questions how legibility can be achieved at street scale; building upon a literature review that helps create a checklist for designing better quality and more graspable streets not only for car users but pedestrians who add value and meaning to any public space. The thesis focuses on a selected case study in chapter three, Ismet Inonu Boulevard in Famagusta, Cyprus, where the checklist created in chapter two is evaluated thoroughly. Being an important axis connecting the Eastern Mediterranean University –a symbol of the city- to the historic old town in the heart of the city, Ismet Inonu Boulevard is analyzed in three sections through the help of an in-depth evaluation of physical characteristics of the street and its activity patterns.

Using a series of techniques such as direct observations, cognitive mapping, interviews and questioners, the research collects the necessary data for the analysis of

the case. The results of the case study indicates that Ismet Inounu Boulevard being part of a general uniform grid planning system offers little surprises to its users. As a commercial street, although it offers images that people can easily remember, the discontinuity of commercial functions along the whole route as well as lack of necessary qualities in the physical structure of the street do not create strong reasons for the pedestrians to use the street. Being a recently developed artery, the street does not possess landmarks of historical importance. Offering little opportunities for the pedestrians, the street is largely dominated by cars and mostly used as a means of vehicular transportation. The findings and results further leads to recommendations for improving the conditions of the selected case so that the legibility of the streets can be enhanced.

Keywords: Successful Public Open Space, Street, Legibility, Ismet Inonu Boulevard, Famagusta.

ÖZ

Iyi tasarlanmış kamusal açık alanlar ,Caddeler , meydanlar ve parklar gibi çok önemli merkezi bir rol oynayan yaşanabilir alanlar olan ve bunlar sosyal etkileşim noktaları olarak hareket ederek şehirlerde insanların buraya gelmesi için zemin oluşturmaktadırlar.Bu kamusal alanların arasında Caddeler insanların yaşamlarında önemli bir rol oynamaya eğilimli olarak her ikisi de eylem olarak ulaşım ve sosyal etkileşim için ortak kanallardır.Bu iki fonksiyondur ki sokaklar akademisyenler için ortak bir araştırma odağı olmuştur.Kusursuz Caddeler yaratmak için sadece motorlu ulaşım hizmeti sunmak yeterli değildir fakat insanlar için interaktif bir zemin oluşturmak için gerekli olan okunaklı caddeler hayati önem taşıyarak bu da insanların kendilerini kolayca görsel ve fiziksel olarak çekiciliğinin yanı sıra insanlar kendilerini yönlendirebilirler .

Bu çerçevede tez sorusu ;Caddeler ölçeğinde nasıl okunabilirlik elde edilebilir? Literatür taramasında yardımcı olan sadece araba kullanıcılarına göre değil , daha kaliteli tasarım için bir kontrol listesi oluşturararak daha açık ,seçik sokaklarla yayalar için kamusal alanlara değer ve anlam katmaktır.Bu tezin odaklandığı , 3. Bölümde vaka çalışması seçilen İsmet İnönü Bulvarı ,Mağusa, Kıbrıs seçilerek kontrol listesinde bölüm 2'de iyice değerlendirilmiştir. Bağlayıcı önemli bir eksen olan Doğu Akdeniz Üniversitesi şehrin kalbi İsmet İnönü Bulvarı 3. Bölümde analiz edilerek fiziksel sokak özelliklerini ve faaliyet kalıplarını derinlemesine bir değerlendirmeye yardımcı olmuştur.Bir dizi teknik kullanılarak; doğrudan gözlem bilişsel haritalama ,görüşme ve anket gibi gerekli veriler araştırmada toplanmıştır.Vaka çalışmasının sonuçları İsmet İnönü Bulvarı olarak kullanıcılarına

küçük süprizler sunmuştur.Caddenin fiziksel yapısında gerekli nitelikleri insanların kolayca hatırlayabilir görüntüleri tüm yol boyunca ticari fonksiyonların devamsızlığı yanı sıra eksikliğini içerse de yayaların Caddeyi kullanmak için ticari bir cadde olarak güçlü bir neden oluşturmamaktadır.Yeni geliştirilmiş bir damar olan Cadde tarihi bir öneme sahip bir yerde değildir.Yayalar için küçük fırsatlar sunan caddeler büyük ölçüde arabaların hakimiyetinde ve çoğunlukla araçların ulaşımında kullanılmaktadır.Bulgular ve sonuçlar seçilen olayın koşullarının iyleştirilmesi için öneriler geliştirmekte ve böylece caddelerin okunabilirliğini artırabilir.

Anahtar Kelimeler: Başarili herkese açık alan, cadde, okunabilirlik ,İsmet İnönü Bulvarı ,Gazimağusa .

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I would like to express my gratitude to my supervisor Assist. Prof. Dr. Pınar Uluçay who has encouraged and guided me in the completion of this thesis. I am also grateful to my jury members, Prof.Dr. Mukaddes Polay and Asst.Prof.Dr. Badiossadat Hassanpour who have tremendously been supportive with their valuable comments. Their contributions have greatly helped to improve this research.

DEDICATION

I owe my thesis to my dear family, my parents, who have supported me immensely during my tough times.

To my Family

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Chapter 1

INTRODUCTION

The term 'Urban Design' broadly attempts to understand how to create better places for people, or more simply "design people-places within city-spaces". When the two words are taken separately they represent clear meanings; 'urban' suggesting the city or town characteristic and 'design' referring to the planning or arrangement of cities or towns at various scales. Public open space (POS) which is an important component of the field of urban design plays an important role in the city because of people's need for social interaction. The urban design field which deals with the planning of public open spaces aims to achieve greater permeability and variety in cities. However, people can only take advantage of these qualities only if they can grasp the layout of a place. Together with the introduction of the modern city planning in the twentieth century and increasing motorized transportation associated with the advancement in technology, the actual use of public open space by the pedestrian was affected negatively due to the city becoming less legible. Due to the emerging similar looking urban forms and reducing variety, the city lost its distinguishing characteristics and therefore identity, becoming less readable to the outsider.

Based on these conjectures, the study concentrates on a case in a contemporary environment in the city of Famagusta, North Cyprus where cognitive mapping and interviews are utilized to question how people orient themselves along the Ismet

Inonu Boulevard also known locally as Salamis Road which connects the Eastern Mediterranean University and the old town of Famagusta. Based on the findings of the cognitive mapping and interviews as well as observations, the research concludes whether Ismet Inonu Boulevard is a legible street based on the findings. The study focuses on questioning the relevant elements that help people find their way around this boulevard and finally concludes with remarks relating to how legibility can be achieved along streets which are part of grid planning patterns.

In line with this objective, the study looks into public open space in the second chapter, focusing on streets which are linear spaces serving different usages such as transportation, movement, interaction and other social activities and attempts to understand how they lost their users, popularity and attractiveness with the introduction of modern planning. Besides POS quality, legibility as an urban design principle is also studied in detail. Chapter three is the analysis of the case where cognitive maps, site surveying and structured interviews are employed to reach to some findings and therefore the conclusion.

1.2 Problem Statement

Streets as one of the most important elements of POS affect the value of social interaction amongst individuals. Designing readable and legible streets as integral part of public open spaces improves the quality of interaction in societies. Unfortunately, today, most urban designers do not care about the usability, readability and legibility of POSs, helping to the creation of abandoned or unusable spaces for long periods of time, requiring huge amount of money for restructuring and rebuilding.

Appearing as a similar case, Ismet Inonu Boulevard in Famagusta as an important artery suffers from similar problems. In order to pinpoint these problems in regards to legibility at street scale, the research focuses on the selected case study and questions:

- What types of POS exist and what are the qualities of successful public open spaces in specific to streets?
- What sort of physical, social and functional characteristics should successful streets possess?
- How does street design affect/increase the legibility in public open spaces?
- What are the most significant elements (nodes/landmarks/signs) that help people finding their ways in public open spaces in specific to selected case study?

1.2 Aim and Objectives of the Study

This study aims to;

- Understand the actual meaning of public open spaces, their types and usages and what affects their quality with significant emphasis on streets
- Examine the physical, social and functional characteristics of the streets;
- Understand what is legibility and how it can be assessed at street scale;
- Propose possible solutions to increase legibility in the selected case study and therefore contemporary cities

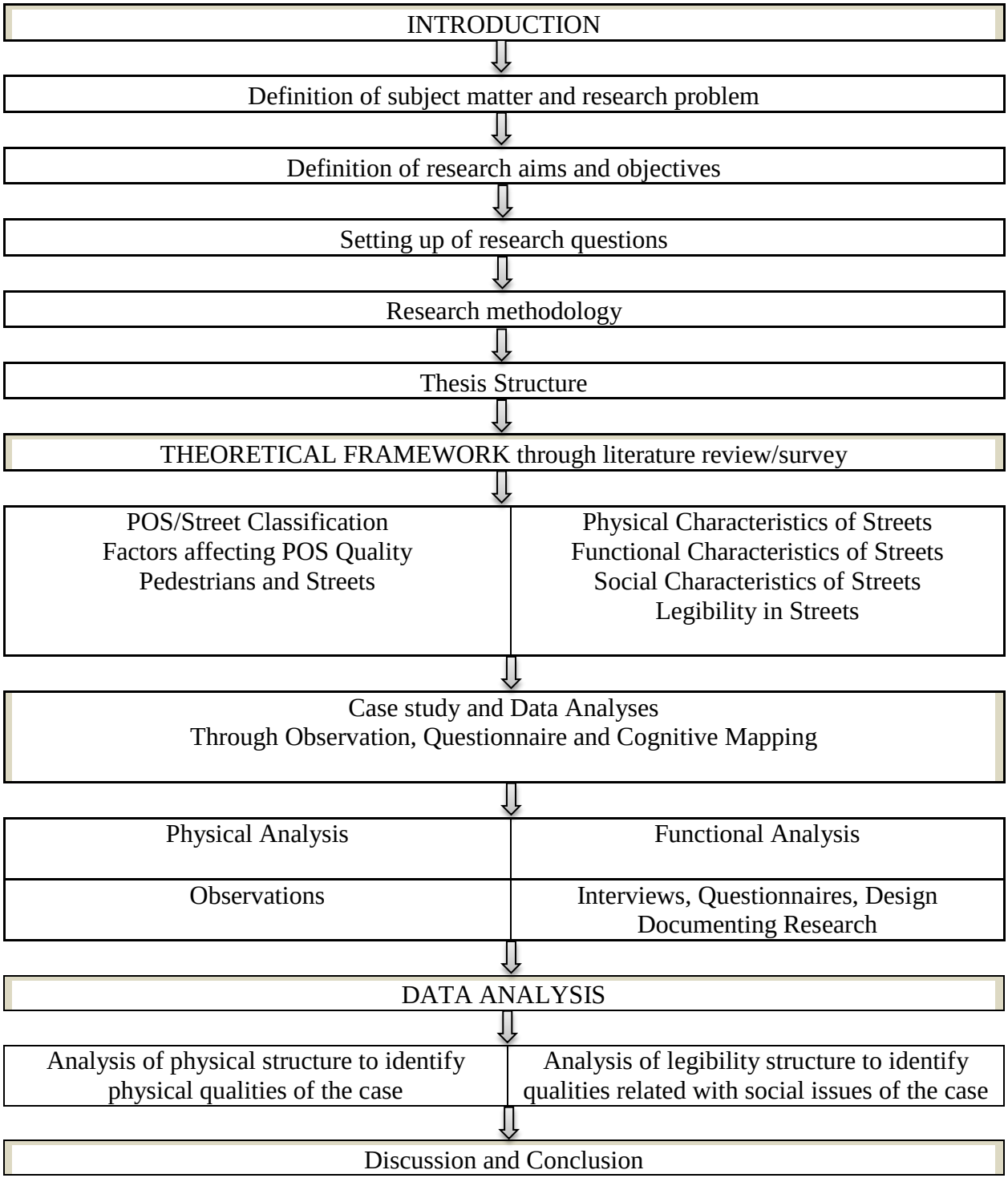
1.3 Research Methodology

This study is based on a theoretical research carried out along a set period of time on resources that could be reached at the time such as books, scientific articles and internet sources specifically relevant to the topic. As far as the case is concerned structured interviews and cognitive mapping are utilized to draw conclusion for the questions put forward. The analysis of Ismet Inonu Boulevard is based on data collection, observations and site surveying where site photography and maps are utilized for a more in depth analysis. The collected data from distributed questionnaires has been analyzed through SPSS 22.0 VS.

1.4 Thesis Structure

The first chapter gives a general introduction on how the thesis is structured, introduces the general problem; and puts forward main aims and objectives. The second chapter introduces the literature review and chapter three investigates the selected case study.

The concluding chapter is structured on two sections; the first part summarizes the theoretical background of the study and analyzes the selected case based on these findings whereas the second part gives out recommendations for developing design guidelines to improve the current situation so that better legibility at the street can be achieved.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Chapter 2

STREET AS PUBLIC OPEN SPACE WITH AN EMPHASIS ON LEGIBILITY

This chapter aims to introduce the reader with relevant information on public open spaces, their typologies and factors that affect their use in daily life. This introductory section is followed by focused analysis on streets as important components of public open spaces. In this part, different kinds of streets, their characteristics and usage will be looked at in more detail in order to equip the reader with necessary background information relating to the topic.

In general, the open space of a city can be categorized as public space, semi-public space and private space. Semi-public space is partially open to a certain group of citizens for their internal usage, for instance, governmental buildings, schools, factories and also not openly managed residences (Silitoe, 1969). On the other hand private space is a personal space which is not open to public (Madanipour, 2003). Public open spaces can also be categorized within three general groups of:

- Outdoor public spaces

Figure 2.1. Outdoor Public Space, Illinois, USA (URL1)

- Indoor Public Spaces: any public institution such as museums, churches, and libraries.

Figure 2.2. Indoor Public Open Space, Stockholm, Sweden (URL2)

- Indoor and Outdoor Quasi: places such as university campuses, shopping malls, sport grounds and any private spaces which are accessible for public.

Figure 2.3. Indoor-outdoor Public Open Space, CavalcavieBussa (URL3)

Interior space, open space and their interactive relations in the city, all together form vessels of almost all public activities. Activities alike is usually carried out in certain interior space (Fischer, 1997) while more social activities like tourism, leisure, transportation and sports, even though sometimes carried out in a stadium or shopping center, mostly are done in open spaces since people need to interact with nature and each other. Because, in open space, people can both enjoy the excitement of activities, interacting with each other as well as enjoying the calmness by observing scenery, sitting-in, and wandering (Wentzlaff, 2015).

Therefore, it is possible to say that public open space is made for people by people as Loukaitou Sideris and Banerjee (1998, p.175) mention.

kinds of member of society from children to more senior citizens (Hayden, 1997).

According to Carmona (2010), the public space is important for good urban living. In recent years, urban design has moved away from object architecture, and started to focus on people's requirements of the space. Numerous authors accept and support the idea that public space has both connective and social functions (Punter, 2009).

In fact, not only in Western but also Eastern countries, human activities are particularly important in perceptions of public space (Gehl, 2011). According to Gehl (2011), the Copenhagen architect, outdoor activities influence user's feeling of space because if people prefer to stay in spaces, this means the space itself seems more 'livable'. Moreover, he states that social activities' quality and intensity will be affected by number of people in a space and the extent to which the quality of space encourages users to linger (Gehl, 2011).

Gehl (2011) claims that any public space should contain some key qualities for providing a high-quality environment:

- Comfort and image – safe and attractive;
- Sociability - fostering neighborliness, friendship, interaction, diversity, pride.

On the other end, there is the infamous work of Lynch (1984) who underlines the essential role of public open spaces such as street in the city as follow:

- Public spaces are open to excessive usage of individuals;
- Place for having mastery and challenges;
- Human based environment for relaxation;
- Place for social interaction and unspecialized contact;

- Place for developing and self-recognition understandability;
- Place for controlling community ideas on unlimited time scale (pp. 397).

Therefore, every public social space contains both social and physical dimensions. The physical dimension refers to space, settings, and generally physical concepts while social refers to events and activities happening in that space (Carmona, 2003).

Public open spaces are separated into two types:

- Natural public spaces: this category is developed naturally without any plan; generally due to the individuals' interest and concentration about the public space.
- Planned public spaces: this type of public space (fig. 2.4.) is created to provide for the needs of people but they do not form naturally (Stone and Borns, 1986).

Figure 2.4. Planned Public Space, New York, USA (URL5)

Various scholars categorized public spaces based on their form:

- Squares and plazas
- Streets

- Parks

According to Carr et al. (1992) these are:

- Public parks;
- Streets;
- Squares and plazas.

2.1 Factors Affecting POS Quality

Well-designed streets, sidewalks, parks and etc. provide a civilized setting for human beings (Jacobs et al., 2000). The link between public areas and public life is two-folded such that new forms of public life require new spaces. Public life needs to have a well-organized public open area, where many elements should be considered. As Francis (1988, Pp. 57-58) states:

- Public open spaces should be flexible for variety of users such as elderly, children and teens.
- Public open spaces should have variety of activities,
- Public open spaces should be comfortable.
- POS should be evaluated, improved and redesigned over time for better results,
- Public open spaces should increase the chance of involvement, manipulation
- and control for its users.
- They should always be accessible to all.
- These spaces should create opportunities for challenge, discovery and delight.
- Public open spaces must be ecologically healthy.
- Public open spaces should be effective for the economics of community.
- Public open spaces should be free.

- These places should be liked by its people who are living or working nearby.
- People who are in public space should feel safe and secure there (Francis,
- 1988).

Jacob and Appleyard (1987) state that well-designed streets in urban areas should consider some goals such as:

- Legibility: explains the quality that affects how to relate to the surrounding environment.
- Livability: a place where everyone can live;
- Identity and control: should possess sense of belonging to the environment and also should have control over the area where issues such as individuality and collectivity are considered.
- Access to opportunities, joy, entertainment and imagination: individuals should feel that the urban area is a break point place from tradition, presenting them the opportunities to experience new things.
- Authenticity and Meaning: the area should be understandable for the users;
- Urban self-reliance: cities should be self-sustaining in terms of energy and scarce resources.
- Accessibility: city should be the environment for all the citizens' livability, identity, opportunity and control.

Based on these goals, an urban environment should have five physical characteristics as follows:

- Minimum density of residential expansion and excessive land use;
- Neighborhoods and livable streets;

- Mixture of activities (living, working, shopping, entertaining and etc. in proximity with each other)
- Mix-used buildings with complex arrangements

Although all the criteria mentioned above are important in creating better quality public open spaces, the thesis will only focus on legibility and investigate its role on creating more livable streets.

2.2 Legibility and Its Effects on POS

Legibility was introduced by Kevin Lynch and is concerned with the relationships of physical elements or urban components and their image ability. A legible layout though will be best at the point where there is a free moving opportunity and when there is ease in connecting people. “Legibility initiatives aim to link urban users to their destinations in a complete movement and information system, thereby making cities accessible, welcoming and easily understood” (Kelly and Kelly, 2003, Pp. 15).

Accordingly, the concept of legibility is a substantial approach of the appreciable quality of urban environment, which play an extremely important role toward increasing the vitality of city. Two publications were really influential in paying attention to cognitive mapping studies. The first one is *The Image* by Boulding in 1958, and the second is *The Image of the City* by Kevin Lynch in 1960. Boulding (1958) emphasized that understanding the image in people’s minds is essential to understanding human behavior.

Lynch (1960) on the other hand defined legibility of a city as “the ease with which its parts can be recognized and organized into a coherent pattern” (Lynch, 1960, pp. 2). Lynch identified five elements (Paths, Edges, Nodes, Districts and Landmarks)

people tend to pick up from the environment to build their images. He urged that these elements are the design criteria for a highly legible and environment. Lynch's work is still used widely; and is the classic reference in cognitive mapping. In it, Lynch constructed a methodology for studying cognitive maps depending on questionnaire and field reconnaissance analysis (Bell et al., 2005) (Figure 2.5). A vivid physical setting with capability of producing a sharp image or playing social role can help for making symbols in collective memories of the city. A good environmental image gives the inhabitants an important sense of familiarity and emotional security about the place (Lynch, 1959).

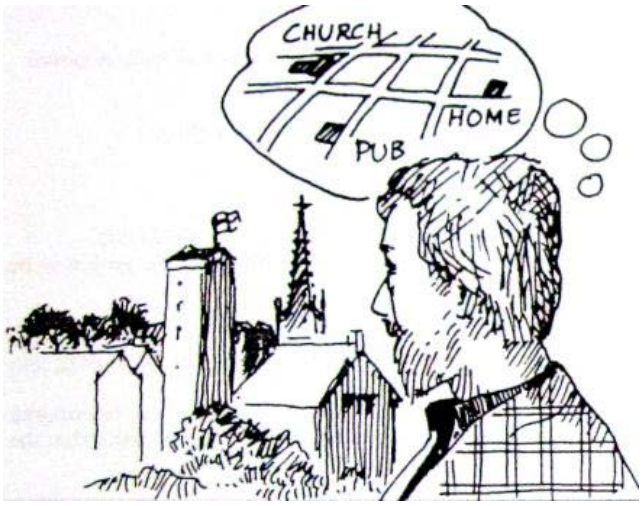


Figure 2.5. Legibility in Public Area (URL6)

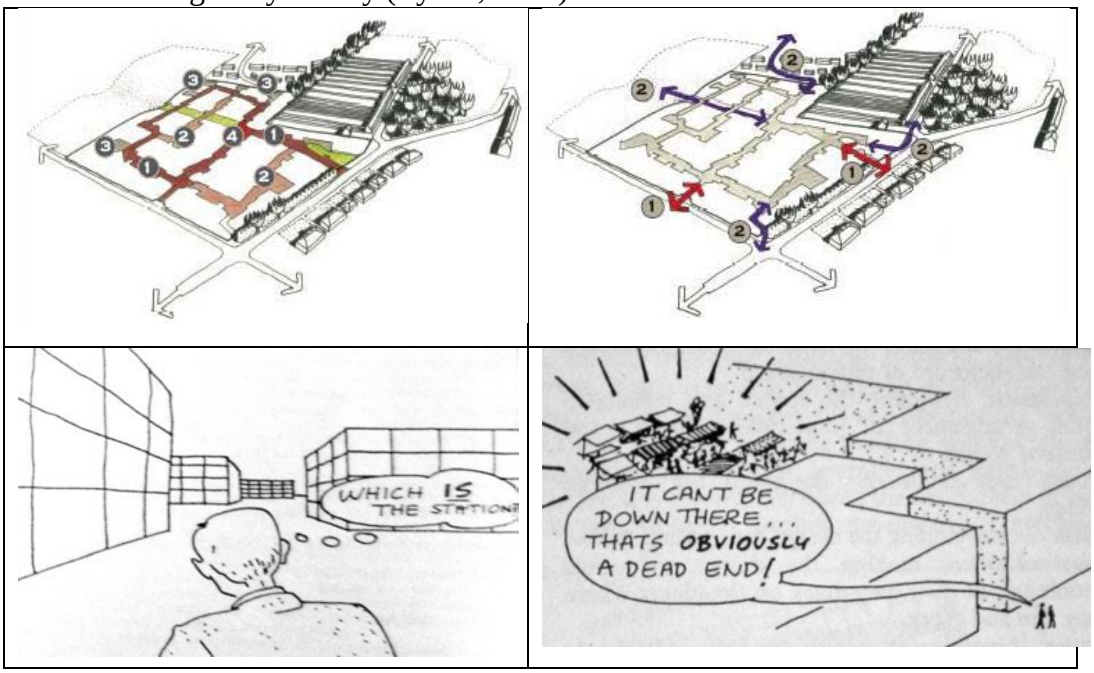
In order to make a city more legible, there should be continuity between salient elements of the city consisting of mixture in environment and memory in mind; between main integrators and visible fields of the landmarks, to form a coherent structure. Alternatively, these elements should overlap to emphasize each other to make the city more legible. The relationship of these two elements in the city structure depends on the degree of irregularity of the layout and the presence of the rules of Gestalt of "good configuration". Urban morphology according to its degree

of irregularity and presence or absence of Gestalt rules can be categorized as organized, semi-organized and unorganized (Batty and Longley, 1988).

Legibility is one of the most important factors to improve the attractiveness of the POS both for tourists and city environment. The importance of performing legibility in the city has been obvious during centuries through people's movement from poor city places to the beautiful, green and legible areas either for living and traveling (Dong, 2013).

Legibility is about the way people perceive, understand and react to the environment. It concerns those qualities of a place which gives it an immediate identity, one which is quickly perceived by its users' mental map. Legibility makes a place graspable according to place layout (Table 2.1).

Table 2.1. Legibility in City (Lynch, 1960)



It is important to emphasize that, in forming a mental image and perceiving the legibility of a given townscape, a person is seeking to ‘make sense of a townscape, and this mode of perceiving the external world is essentially practical and instrumental, and thus one which primarily engages a person’s intellect and reasoning mind, as distinct from their emotions and feelings about the objects being perceived. However, legibility on its own will not create a successful urban space and other key qualities should also exist in a city. These are the basic principles of theory of urban design and can be listed as follows based on Long and Baran (2012):

1) Robustness is the quality which describes the degree to which people can use a given place for different purposes. It's in context to the quality of the public realm, which is the place for people to gather. Hence, to create an environment where everyone can access and benefit from the full range of opportunities available to the members of the society.
2) Permeability is the quality which affects the mobility of the people within the urban tissue .Its mainly about making connections in order to ease the movement. A good design would integrate the existing urban form, the natural and the built environments.
3) Legibility explains the quality that affects how easily people can understand and relate to the surrounding environment. The design focus would be to address the connections between people and places by considering the activities of people to access public spaces, recreational areas and to socialize (Lynch, 1959).
4) Variety, termed for the range of uses, tenure, character, population available with the urban quarter. Also describes more of the mixed uses or the diversity of uses and forms. The design criteria would work at addressing the

connections between people and places by considering the need of the people to access jobs and key services.

5) Visual appropriateness describes the quality of appearance/ aesthetics of a place making people aware of the choices available.
6) Cleanliness which is to make sure to minimize pollution.
7) Bio-diversity which is to preserve and protect the present wild-life corridor and use natural management.
8) Energy Efficiency, which is interested on keeping a tab on the energy consumption within a house, building or on a city scale.
9) Richness is the quality that affects people's choice of the sensory experiences.
10) Community control relating to the individuality of the neighbor community of people. This was added instead of the Personalization principle (Long and Baran, 2012).

Most of these principles really help the urban designer in building up a society with a character. Understanding these basic fundamentals, and designing in context helps increase the quality of life. "Nothing is meant to be left for chance which means to say that today's city is not an accident. Its generic growth and form probably is unintentional, but it's not accidental" (Carmona, 2003).

However, legibility as the main focus of the study will be looked at in more detail. Traditional cities were always legible due to the fact that the important civic buildings in the community or city used to have a sense of relevance with the local architectural flavor, but the modern city is all steel and glass with the Western influence. So there always tends to be some sort of confusion there (Lee, 2014).

Lynch also suggests five criteria for legibility (1995);

1) 'Vivid differentiated elements' which can be conceived by majority of adults and suitable for them
2) The structured image can be legible in general level as well as in at deeper and detailed level
3) The image can be seen differently by people with different desires and capabilities.
4) The image must be adaptable in change and growth of the environment.
5) The image must be able associated to functional and social organization.

We can formulate that working according to Lynch's criteria can ensure: 1) everyone can understand the communication, 2) few mistake will occur wherever the image is present by any channel, 3) the image is suitable for creative people and encouraging their thinking, 4) the image is consistent but easy to adapt in different environment and background and 5) the image will be useful for various organization in the city.

However, legibility as the main focus of this study will be looked at in more detail. Undoubtedly, glancing back at the history of cities will help the reader understand how legibility was achieved in the traditional urban environment. It is the modern city with grid planning pattern that is criticized for not presenting memorable layouts that help people grasp an environment. Lee (2014) highlights this issue by suggesting that traditional societies and cities were most of the time legible because of their important civic centers that today’s modern cities mostly lack.

For an urban environment to be readable and memorable for its users, the city needs to be legible at different scales and levels. If a city does not have a legible planning

layout, perhaps it would be difficult to expect the same sensitivity at district or street levels. As far as levels of legibility are concerned, we may refer to two different elements which shall be explained in more detail below.

2.2.1 Levels of Legibility

Legibility has two important levels such as activity patterns and physical form. At each level, places may be readable differently. This can also be acceptable with pattern of activity use which can be grasped without being too much concerned about the form of place. Better use of a place's potential can be achieved through the complement of the form and activity patterns of that space (Lynch, 1959).

Compared to Carmona and Tiesdell (2007) who favors spatial effects (such as obliquely related streets entering a plaza) whose explanation escapes the naive viewer, Lynch suggests clearly comprehensible interrelationships, even recommending perpendicular or other rectilinear relationships that users can remember and identify with.

The meaning of the legibility term in both form and use is reduced in the recent modern era. This can be observable in comparison between modern city and the traditional one or traditional city with its modern counterparts (Lynch, 1959). This affects the use of public space. The modern counterparts of the cities (either traditional or modern) are the main factors in decreasing the use of POS along with the increase in automobile transportation.

A comparison of traditional city versus modern will give the reader a better understanding on how legibility helps identify better quality spaces. In the traditional

city, places of public relevance were identified easily within the whole city structure. The largest open spaces belonged to the significant public facilities which helped public relevance stood out from the rest (Lynch, 1959).

In contrast, modern cities are legible through large office blocks which are privately owned that occupies the key city positions. These bureaucratic buildings are irrelevant to the public use of POS. These buildings corrupt the visual aesthetics of the public space and create confusion between the important activity forms and patterns. This situation is worse when privately owned buildings start looking similar to the public ones.

In order to achieve better legibility in the city, the structure and design of physical layouts and patterns of use should be well considered. The point of having legible layout enables the public to have the accurate and clear image from the environment. Moreover, a city is distinguishable when it possesses certain characteristics which can be defined as elements of legibility which will be explained in more detail below.

2.2.2 Elements of Legibility

The key physical elements in making a place legible are: Paths, Edges, Nodes, Landmarks and Districts.

- **Path**

  Path is the most significant among the rest. Paths are the channels along which the observer customarily, occasionally or potentially moves. Paths are channel such as alleys, motorways, railways and streets which most of the public place them in their image from the POS. For example by concentrating special uses or activities on the street may give it predominance in the mind of the observer (Martinez, 2012).

- **Edge**

Edges normally are the linear criteria that define a path and edges are not used such as paths. Edges are usually used based on their positions where their nature is obscured and saved. They also tend to behave as the boundaries between two character areas. They can be designed to give a sense of direction and improve the travel quality. The concentration of paths can be diverted with activities (Martinez, 2012).

- **Node**

Nodes can be designed with strategic foci for an observer to typically enter these sorts of junction area. These could also be paths crossing, with a big public square or a landmark (Martinez, 2012). Nodes are the focal areas such as junctions of paths (Figure 2.6).

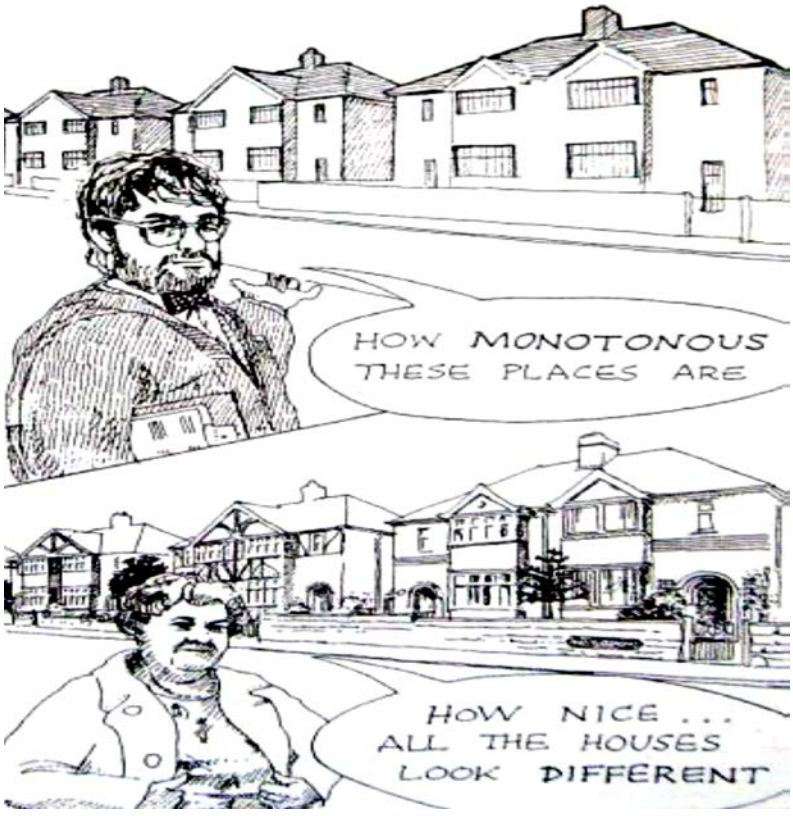


Figure 2.6. Legibility Perception

- **Landmark**

Landmarks tend to help the observer in terms of orientation, easily identifying also with the physical elements that bring it all together like the paths and edges. Also tends to bring about a feeling of class and uniqueness to the context (Salehi, Zabihi and Zarabadi, 2014). Landmarks are those points which most of the people see or experience them from outside (Figure 2.25). Landmarks tend to help the observer in terms of orientation, easily identifying also with the physical elements that bring it all together like the paths and edges. Also tends to bring about a feeling of class and uniqueness to the context.

- **District**

Districts are relatively larger areas which can have a distinct characteristic by which the observer can relate to. For example like china town in London. Some of the main physical characteristics that determine a districts area can be an endless variety of components, texture, shapes, forms, detail, building types, inhabitants and topography etc. (Martinez, 2012).

Other than these main features the combining of new and existing elements can also try to grasp the observer. For instance: combining paths and nodes, existing landmarks, edges and districts etc.

For example, the city of Bath has a very legible nodal character where all the buildings are at the right node where paths and edges crossing at the same junction. Therefore, combining all of these issues altogether creates a landmark character space as a whole.

At times when certain areas within a city aren't legible, it certainly becomes difficult to navigate around. In Chandigarh, though the grid iron pattern design was meant to make it more permeable, certain nodes and areas look exactly the same. Visitors find this to be of a big problem, since they tend to get lost easily (Ewing, 2013).

These criteria have a strong resemblance to the principles used in developing nations like India and China. British influence in the Indian cities like Delhi, Mumbai and Calcutta can be easily seen as though like a big foot print. Understanding the overall impact of the railways and the colonization strategies of the British in India, urban designers have come away as far as the sustainable age of today. Incorporating the Indian cultural society in our neighborhoods, slowly over the years, and at the same time being open to the western influence in design and policies has helped the Indian master planners to come forth with new innovative ideas to bring about changes to the Indian urban tissue (Weisman, 1981).

Although all this criteria are important in making a city graspable for its users, at street scale some of these elements gain more importance, such as the way path and edge are designed, the existence of landmarks and nodes along that particular street need to be emphasized more. In order to be able to understand the street scale deeper, it is wise to understand how it can be evaluated in terms of its physical layout and pattern of use.

2.3 The Street in Terms of its Physical Layout and Pattern of Use

For several decades the role and design of streets were neglected in cities. Street is a mean of communication, transport, circulation and neighborhoods (Lipton, 2002). Streets as the first institution of the city should be supreme. Streets as the essential shared public spaces are mostly overlooked or neglected. Nowadays, streets are mostly used for parking, cars, transporting, and advertising goods (Hebbert, 2002 Pp. 113).

The use of streets has changed over the centuries, especially after the emergence of cars. In many locations there are few people-using streets as a pedestrian resource, with the resultant loss of the 'eyes of the street' as described by Jacobs (Woolley, 2003, Pp.78-82).

Streets, as an important part of the image of city, are designed cool and wide, considered more about cars instead of people. Traditional streets inspirit lost. As traditional streets were alive and friendly to people, design a kind of "traditional streets" is a good start to revival the public street space and renew the city context.

Streets as the way of movement and mobility refer to three-dimensional space. Streets surround by buildings on both opposite sides. Streets are the movement point and an arena for expression socially (Moughtin, 2003). In contrast to streets, roads are paths to end the trip between two houses. Street is a road which movement happens along adjacent houses.

In the main axis transformation of Paris, the Louvre Palace, the Place de la Concorde, the Arch de Triumph, la Defense and other important public spaces were

organized consciously to form a series of scene to create a rich streetscape located all in Champs Elyse Street . Medieval winding streets focused more on architectural detail and combined with the sculptures, fountains, green, open-air cafes etc. to build a continuous and diversiform streetscape. It is worth to mention that the arrangement of the open-air dining facilities was controlled by urban planning, which not only changed the traditional single-function and image of the street space, and also formed a dynamic and user-friendly outdoor space (Moughtin, 2003). So the main street should contain the outstanding features such as landmarks and nodes.

New types of streets emerged in need to improve its structural layout since the second half of 20th century in northern part of Europe (Vuchic, 2007, Pp. 17). Streets should be the center of attention of public due the activities it offers and should be observable (Jacobs, 1995).

In terms of activity patterns, streets have functions as follow:

- Commercial service and activity point
- Access to spaces and buildings
- Movement and circulation for pedestrians and vehicle
- Parking and storage space (Bell, 2005).

Streets have the stand for important cultural, social and political constructs of the cities – urban planners and design narratives have decided to recognize streets as important elements in place making efforts. Streets include wider sidewalks, street furniture, articulated street fronts (which are more visually interesting and create spaces for lingering), shade (or, in cooler months, sun) and etc. In sum, street is an exemplary path that is both rigorous and accessible. Planners, architects and

designers, social scientists and transportation engineers would all benefit from its skilled integration of theories and methods from across these disciplines (Kankaya et al., 2015).

2.3.1 Physical Characteristics of Streets

Streets have several physical characteristics based on various scholars.

Jacobs (1993) divided these characteristics into vertical and horizontal.

- Vertical refers to trees, building, walls, and all vertical structures, but
- Horizontal aspect refers to length, width and spacing of streets (Jacobs, 1993).

Physical characteristics of streets include their shape (straight vs curve), forms (long vs short, open vs enclosed, formal vs informal and wide vs narrow) (Moughtin, 1992). Well-designed street physically attributes on the livability of street (Mahmoudi, Ahmad and Abbasi, 2015). Next to all of these, same streets combine these two aspects with the attention to floor for better usability (Kim, 2014).

All factors such as proportion, rhythm, contrast, scale and the connecting path to other Streets can be explained in the form of streets (Mackett et al., 2008). Urban designers should care about all these features to increase the walkability and livability of streets for all groups of people including children, adult, old and disabled individuals (Forsyth et al., 2008).

Generally, physical characteristics of streets can be mentioned as form, length, proportions, edge and center, unity, path, facades, and finally elements of streets (Moughtin, 1992).

Now there is in detail information about all of these characteristics with related information.

- ***Forms of the Street***

  Street forms is divided based on polar qualities as short, long, curved, wide, and narrow or etc. Trancik (1986) categorized streets as inflected (curved) or uninflected ones (straight).

  Curved streets convey the sense of continuous and length to the pedestrians through irregular footage (Cullen, 1961); While the straight streets is designed regardless of any concern for terrain, visual attractions, and various types of further improvement (Gibberd, 1955). Streets are the footage of building; they are the place of people, pictures, and histories along the time.

  Curved streets are pleasant, satisfying and attractive for planners and pedestrians while the straight streets are monumental (Collins, 1986). avoiding a current design structure, squaring up the connection points by creating curve ways both to enable circulation, continuous movement and to have well-shaped building forms and plots (Gebru, 2015).

  In narrow streets vertical features are more significant and some part of facades are observable in sharp view but in broad streets complete view of facades and their surrounding are evident; Moughtin (1992) approved the benefits of both Forms of curved and straight streets. He also mentioned that wide streets make the city hotter and less healthy while the narrower one let the sunshine to shine and air move (Kostof, 1992, Pp. 69).

- **Street Length**

Based on the standards of urban design, the length of the streets should be approximately 1 mile or 1500m; if it is more than this the human scale would be lost and smaller can face the difficulty for the enclosure of view (Moughtin, 1992). Long streets can be used as connector while short ones for residential usage are useful (Figure 2.7).

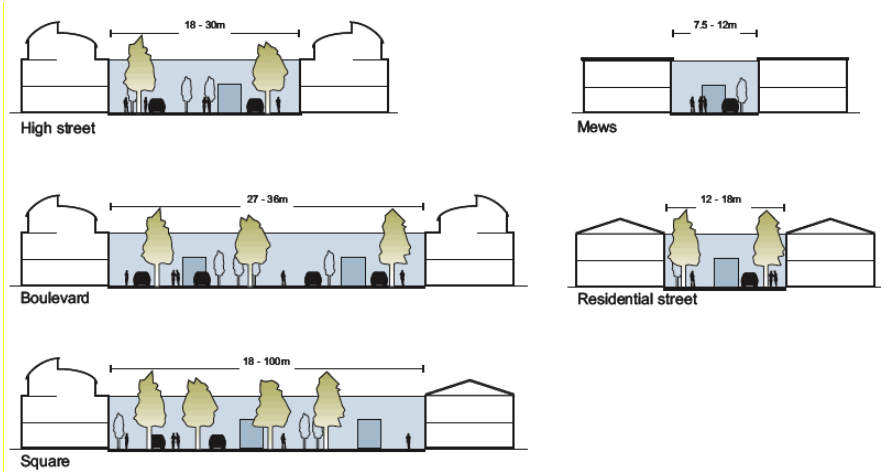


Figure 2.7. Street Width according to usage (URL3)

- **Street Proportion**

Street proportion is another important factor in urban design which the analysis and basic ratio comes from width, height to length. The idea of street proportion dates back to the Hellenic Greece time for the notion of symmetry (Moughtin, 1992).

Streets with well-designed structure have well-defined form with positive sense of enclosure. Spatial enclosure determines by the continuity of the walls rather than height-to-width ratio (Sitte, 1945). Streets have two walls which define

their area so to represent the sense of unifying the area the outward view should have enough space (Carmona, 2010).

Providing suitable height to width ratio motivate the people to walk due to scale on thoroughfares. Based on Figure (2.8), Human scale ratio falls between 1:2 and 1:3 based on front buildings; these ratios are comfortable for people and motivate them to walk (Sitte, 1945).

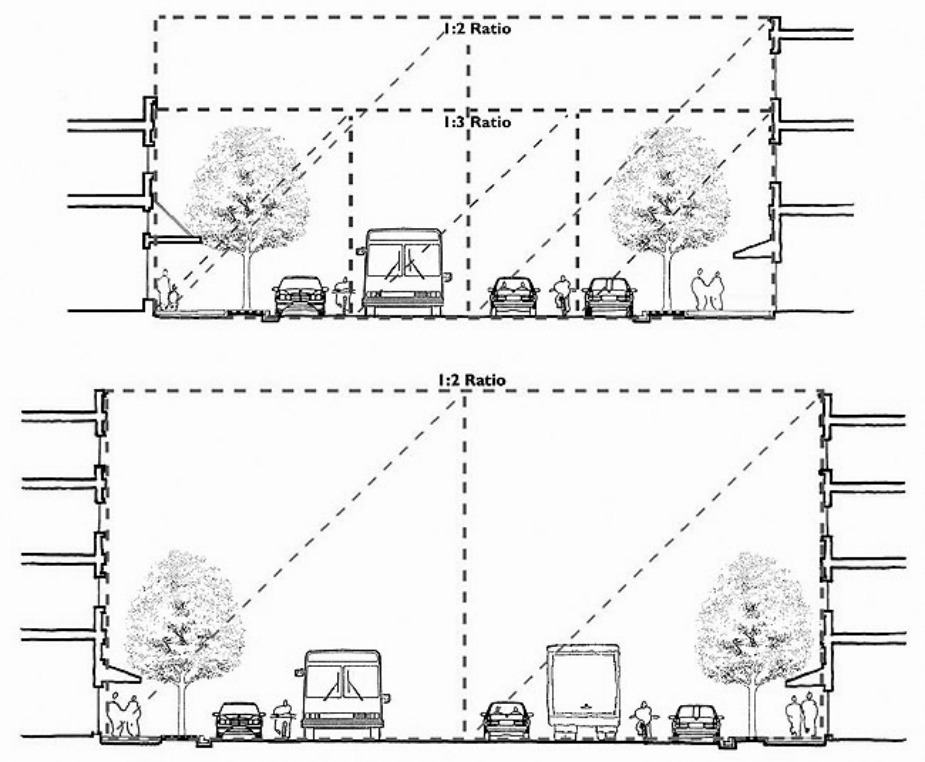


Figure 2.8. Illustration of Height to Width Ratios (URL4)

Building width, like building height, contributes to the sense of enclosure of the thoroughfare. There are three elements of width: (1) the percentage of a building's width fronting the street, which should range from about 70 percent in suburban environments to nearly 100 percent in urban environments; (2) the distance between buildings or building separation, which should range from 0 to

30 feet; and (3) the articulation of buildings (an architectural term that refers to dividing building facades into distinct parts to reduce the appearance of the building's mass adjacent to the sidewalk, identify building entrances and minimize uninviting blank walls) resulting in a scale of building that is comfortable to a person walking adjacent to it and adding architectural diversity with interest (Sitte, 1945) (Figure 2.8).

Therefore the proportion of streets is one of the most important factors in designing a good street in regards to height and width. Wide roads and streets benefits drivers but they are not suitable for shopping and walking. Providing socially attractive spaces with narrow pedestrianized streets and walls higher than street width will help absorbing more people (Moughtin, 1992).

According to Moughtin (1992), it is not always easy to find the right proportions in term of length and width in order to design well enclosed streets. Streets with a width of 6-9m (20-30ft) including buildings with 3 or 4 floors provide the perfect situation for street completeness.

Street proportion and scale is important not in terms of aesthetic but also due to the climate and environmental characteristics of the place. Therefore, designing the street proportion should be one of the main factors to consider. For example streets in cold weather should have wider streets to let the sun shine and penetrate over the street to make it warmer, but in hot and humid weather, streets should be narrower with higher buildings to make more shades and providing smoother and healthier weather (Mehta, 2013).

- **Street Unity**

Applying unity in streets is possible by architectural elements, common materials, and details of buildings. Buildings' roofline works as the lid of the streets and is the most important factor in defining the skyline. Viewing the streets from skyline shows quite different scene to the viewer. Developing one part or continuing to set some part does not necessarily mean unity; the whole structure of the street should be developed and improved together in a unit way to contribute as street unity (Moughtin, 1992).

Therefore in the design of streets, unity should also be considered as the important factor to show the arrangement in the area (Moughtin, 1992). In designing the street, the complete street scene should be considered rather than private and personal structures (Moughtin, 1992).

- **Existence of Edge and Center**

Streets as the transport and movement path for the vehicles have another important role in the community as public space. In achieving the well-designed public space, considering edge and center is also important. Alexander et al. (1977) assert the importance of center in their studies. Alexander et al. (1977) mentioned that a public open space without a center is empty and there would be no place for people amusement and gathering (Pp. 606). Designing the center with some signs and symbols or natural elements like trees can give an identity to the public open space.

In addition to center, edge is another important factor that should be considered in public open spaces to define the borders and boundaries. Moreover, edge is the sector with volume which increases the quality of the street.

The important element about street edge is the quality of transparency at edges of streets where private, less public and public realm meets. Actually pointing the start and end part of the street is not easy to fix or make (Alexander et al., 1977).

Determining the edge of the streets with its function is important. Studying the edge of the street from functional point of view gives us two kind of active and passive edges. Active edges of the streets are those that people use them during their daily lives and contribute to an individual's activities. While passive edge is those that construct no connection with streets user and they have no livability and activity such as houses, vacant buildings and lands.

- **Facades**

Facades are surface of the building's block facing the street. Facades are important due to the representation of experience, diversity and visual richness they represent to the viewer. Visual richness is related to the walls, color, windows, buildings, light and shade contrast and so on. Visual aesthetic of urban environment is achieved both from spatial and physical characteristics of buildings such as surface, decoration, colors and etc. (Carmona, 2003). Contrast and similarity are also amongst the design principles that architects utilize for leaving an impact on the viewer (Moughtin, 1992). Not only the architectural styles but also the visual elements in the structuring of buildings are important. Facades can be analyzed based on three parts such as ground floor, the roof and the main floor in terms of formal functions and symbolic qualities. Ground floor as the foundation is connected to the pavement and floor. The middle part includes windows and rows; the last part which is the roof connects the building to the sky. Decorating each part depends on its position in the eyes of viewers

(Moughtin, 1999, Pp. 25). Below there are some examples of facades in different countries with different structures, colors, windows and visual effects.

It is possible to provide various façade designs for one building. The most vital part is the foundation of building as the main entrance and front floor which is observable by passersby.

According to Buchanan (1988) facades can be treated in various ways in order to prevent repetitive and boring outlooks and these are as follows:

- Create a sense of place.
- Mediate between outside / inside, and private / public space with providing gradation between them.
- Contain windows to show people presence while framing the internal life.
- Comprising character to acknowledge conventions and create connection in line with the buildings.
- Having a sense of materials expressive of the construction form
- Have tactile, substantial and decorative natural materials based on weather
- Have confuses, delights and intrigues decoration (Pp.25-27).

Considering harmonization of the building with its surrounding is also important for street view in the eyes of pedestrians (Tibbalds, 1992).

All of these elements should be designed in term of natural lighting (efficient use of sunlight), wind flow (providing natural cold weather for pedestrians), and shading (providing available shad or sunlight based on climate is essential) (Jacobs, 1993).

Street elements can be viewed under five categories as follows:

- Street Furniture: The overall tools and equipment placed in urban public spaces like street lights, signs, symbols, benches, monuments, public art, planters, telephone boot bank and bus stop etc.
- Artificial Lighting Elements: This type of lighting is mainly used for vehicles and have two functions; firstly as statutory lighting to help pedestrians to find the way for walking and amenity lighting is used to increase the sense of street bringing liveliness like shop lighting, seasonal lighting and lights at parks and signs.
- Street signs: Signs are tools for directing, entertaining, advertising, locating and informing. Without the availability of signs people would be confused for movement and direction and unfortunately there would be accident. Signs attract the readers' attention through picture, words or symbols. Regardless of the creativity in the design of signs, they have meanings. Throughout the history of cities and countries, signs have the prominent role in the landscapes through form and message (Peet, 1996) (Figure 2.9).

Figure 2.9. Street Signs, Lefkosa, KKTC

The relationship between sign and city changed due to urban development and therefore transformation of urban form and development making their distribution more complex. Signs have been part of urban life since the time of Babylonian and Egyptian (Tocker, 1969). Ancient Romans use signs as the pictures or symbols to provoke their purpose (Toner, 2013). Based on the Ancient Roman's use of signs and symbols gradually all European countries started to force their municipalities to put these sign in streets and shops to facilitate communication and guidance (Wagner, 1954).

The variety of signs create new place for improvement of cities and expression of urban culture. During the history, artists were also the main players in making up

the signs through painting on the streets and on the walls. Development in technology improves the appearance and types of signs.

- Public Art: this type of art is referred to the artificial and artistic features decorated and designed to show the public domain and be accessible for all (Carmona, 2003) (Figure 2.10).

Figure 2. 10. Public Art, New York, USA (URL24)

2.3.2 Functional Characteristics of Streets

Streets should be considered as a place more than just a pathway for transportation. Streets are actually a place to sit, stay, wait and relax rather than moving through (Barnett, 1982). According to what Norberg-Schulz (1971) mentioned streets are the representation of life's history.

Functional classification is an ordering system that defines "the part that any particular road or street should play in serving the flow of trips through a highway network." Functional classification categorizes streets according to their ability to 1) move traffic, and 2) provide access to adjacent properties. Street types under functional classification include "local streets," medium-sized "collectors," and highway-type "arterials" (Norberg-Schulz, 1971).

City streets are complex places where functional classification schemes—whether from a state agency or from the Universal Highway Administration—are generally too limiting as a basis for design capable of achieving social and economic goals for quality of life, mobility, and urban vitality. Such state or Universal standards must be adapted to the urban environment before adoption so that city leaders maintain their flexibility to make streets a supportive element of a socially and economically thriving public realm (Norberg-Schulz, 1971).

Each project should also be approached with sound case-by-case professional Judgment. In certain cases, cities may choose to alter a street's classification level to better align with a community's vision for its future.

Updated street design standards should be consistent with citywide goals for economic growth, development, and urban design. These standards should attempt to capture the unique local relationship between the built realm and the surrounding streetscape, encapsulating the varying scales at which motorists, bicyclists, and pedestrians interact with individual corridors as well as the overall street network (Smith, 1994).

Many cities have developed street functional classification systems specific to avenue their local needs. These classification systems generally combine 2–3 variables that guide decision-making: (Smith, 1994)

- Street type and usage
- Urban design context and built environment
- Overlays, including modal priorities, special uses, and historic designations

Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide (Das, Lee, Sillitoe, Dawson, Lee and Orengo, 2015). Basic to this process is the recognition that individual roads and streets do not serve traveling independently in any major way (Das et al., 2015). Rather, most travel involves movement through a network of roads. It becomes necessary then to determine how this travel can be channelized within the network in a logical and efficient manner (Takami, Arai, Takemoto, Uchiyama, and Taniguchi, 2015). Functional classification defines the nature of this channelization process by defining the part that any particular road or street should play in serving the flow of trips through a highway network (Das et al., 2015).

Based on empirical studies, functional characteristics have various elements such as Density and mixed use in streets, Active-passive edge and permeability and accessibility. Now there is more detailed explanation about every element (Takami et al., 2015).

- Mixed Use and Density

Providing adequate density of people and activities in streets is one way of keeping vitality for streets. Having density and diversity of various activities in streets make them alive and attract more people for different purposes (Jacob, 1961). Availability of spatial and temporal concentration of different uses and various land uses create the well-designed streets. As a result of functional zoning policies, sterility is an answer which in respect to it mixed use planning has been confirmed as an urban design objective (Carmona, 2003). Overlapping and interweaving of different activities are an essential phenomenon in vitality of streets which all of these should

be inline and familiar to the city structure and functions (Jacob, 1961). He states four conditions for diversity of the streets such as:

- Availability of one or more than one main function in the street
- Short blocks to provide opportunities for turning to corners
- Availability of mixture of building with different age and condition
- Density in people concentration for different purposes.

For mixed use following benefits are highlighted by Banister (2012) as:

- Creating more access to facilities;
- Making more social interaction opportunities
- Providing diverse communities in social manner
- Making efficient use of space and buildings
- Providing various choices based on lifestyles, location and building types
- Providing more vitality and street life in urban environment

Therefore, mixed use empowers walking in the daily life and density gives the variety of choice to the various lifestyles and cultures (Carmona, 2007). Based on Duany et al (2000) the efficiency of mixed used streets are in availability of various functions naming from stores, malls, parks and schools so that people can satisfy their needs with walking.

A mixture of mixed use and density can provide wide array of benefits to the town such as:

- Social: encouraging social interactions
- Economic: improving the economic capability of infrastructure and development
- Transport: mixed use of facility provide density of walking while decreasing car travels and car parks.

Environmental: high density decreases the transportation by cars or any other sorts of transportations; therefore, reducing the energy and resource consumptions, and also reduce environmental pollution (Banister, 2012).

- Active-Passive Edges in Streets

It is important to consider the active and passive function of buildings in streets. Functional structure of each building should be in such a way to provide the active relationship to the life of the streets.

Public edge of building should communicate with the active life of the streets and bring vitality to there (Carmona et al., 2003). MacCormac (1983) stated about "osmotic" properties alongside of streets which give life by indicating percolating activities. That is, some land may show the irrelevant relationship and interest in the people while there are some which involve the people to do activities. Some examples of active edges are such as café, housing, restaurant, small offices, shops and etc.

- Accessibility and Permeability in Streets

It is worthy to mention the most important purpose of the streets as the transportation path from one place to another. Providing the ease of access between two areas is the main goal of the streets. Next to accessibility, permeability is also offering individuals the possibility to access to their final destination while offering attractive social spaces to improve the interaction between people.

Tibbalds (2001, Pp. 49) defined permeability as the freedom an individual can walk and look around the spaces. Alongside of availability of accessibility and

permeability, the physical quality of the street such as width, slopes and number should be visible to the people. One of the most important factors of accessibility is the ease of reaching from one place via public transit, cars, walking or any other ways to the destination. This can be the main characteristics of good city and well-design streets (Figure 2.11).

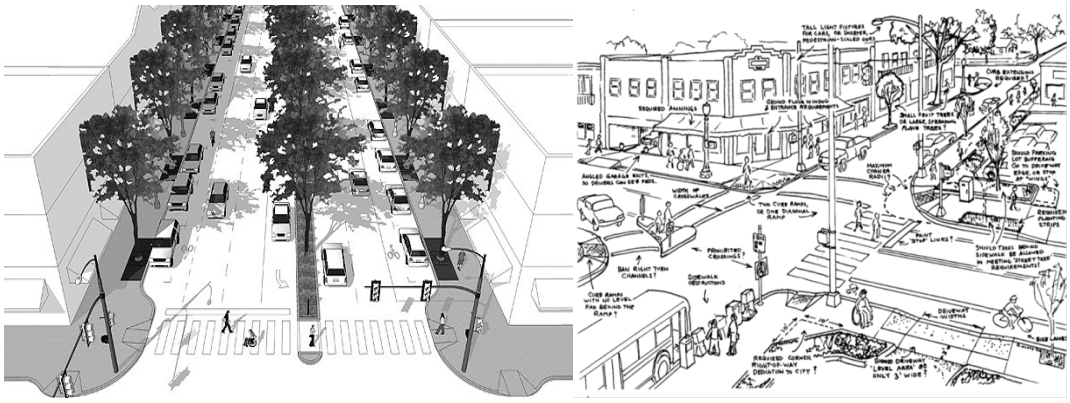


Figure 2.11. Accessibility in the Street (URL26)

2.3.3 Social Characteristics of Streets

Traditional street space held abundant activities and showed different information at one time, thereby it was hard to explain the street space clearly but it was harmonious.

However, towards the end of the twentieth century the amount of vehicular traffic increased quickly so that most streets became dominated by car and people's daily walking activities disappeared. And with the development of the modern city, the traditional lifestyle and character were negatively affected. Increasing number of people start to ask for human space and unique city culture which root is mainly city's own traditional culture context.

Although the traditional shape of cities and architecture has its own historical limitations, people are still able to learn from these rich heritages. Due to the rapid development of urbanism and demand of post-war reconstruction, the idea of functionalism became the mainstream of urban planning theories. Athens Charter (1931) established the key position of functionalism in the urban planning area, and over-emphasized the function zoning.

It deviated from the diversity of the life and the city became lifeless and impersonal. Generally, social aspects of the cities embrace some sort of problems and conflicts. These social conflicts effect on development and transportation of urban context. Scholars think of the streets as the social space rather than movement. Streets as the popular space for people to meet each other are the best place for social communications and psychological discussions in community (Jacobs, 1965).

City is where human activities take place in urban design. The design of city shaping, forming and operating is apart from spatial framework of habitants' context (Shamsuddin, 2011). The city is a patchwork of land uses and urban design is the thread that weaves these uses together.

The evolving cities and their habitants should be able to engage in a communal existence around a public space, a street, a square, a figural place. In many cases nowadays and due to various reasons urban public space is empty of use, sense and context therefore the inhabitants tend to create social life in private, enclosed territories. The 'unshaped anti-space' (Trancik, 1986) that is what is referred to as lost space.

The Modern movement that dominated most of the 20th century and has shaped many buildings as well as many cities is strongly criticized that at various points intentionally did not enable the formation of lost spaces in cities. Even though it did enhance several public interest and activities in the 1943 charter of Athens, it draws little attention to the historically created public urban spaces. As Madanipour (2003) suggests:

"What they sought was a redefinition of the relationship between public and private space, which would reshape the urban space, creating large quantities of open space for hygienic as well as aesthetic reasons. What resulted were vast expanses of space which could have little or no connection with the other spaces of the city and could be left underused only to be watched from the top of high rise buildings or from car windows."

Therefore, the human dimension in outdoor urban spaces was neglected in order to promote vast open air spaces.

Moreover, the modern era promoted the design of high rise, free standing buildings that withdraw themselves from the street level and the public realm and intensified the out of scale proportion of a building with its linked outdoor space. In order to enhance function Modernism overtook the strong relationship between public outdoor space and human activities using it (Madanipour, 2003).

Another factor that has alienated public space from its scale and qualities is the privatization of urban space. Trancik (1986) commented that "we have transformed the city of collective spaces into the city of private icons". The immense projection

of certain buildings-sculptures that are nonetheless private has caused the loss of coherence of the urban tissue and the decadence of the public realm.

The design of these buildings and therefore of the outdoor spaces they create has to do with showing off a status symbol and not any kind of effort to integrate or interact with the outdoor surrounding areas. The result is a loose gathering of private building with flowing outdoor areas without scale, qualities or coherence with one another (Trancik, 1986).

Gehl (1987) divided outdoor activities in three categories as:

- Necessary activities: more or less obligatory to participate without considering physical environment such as shopping first need materials,
- Optional activities: if the condition for participating in activity happened and it was a desire such as sunbathing,
- Social activities: depending on existence of other people and availability of public spaces for linking different groups (Gehl, 1987).

Moundon (1987) states another classification for human activities as below:

- Pedestrian Movement: shopping and walking
    - Dynamic Pedestrians behavior: shopping and walking
    - Static Pedestrians Behavior: eating, working, sitting;
- Non-pedestrian Movement: Wheeled vehicle movement such as bicycles, cars and buses.

In order for a street space to be attractive to its users, many of these aforementioned parameters -functional, physical and social characteristics-need to be achieved at

street scale. In order to be able to understand the topic of activity patterns in relation to streets, it is important to mention about the classification of streets.

2.4. The Street in terms of Typology

Scholars have represented different categories for street classification. According to Moughtin (1992) for example, streets are divided into four categories:

Civic streets: Street surrounded by civic buildings such as theater and museums (Figure 2.12). These streets are one of the main streets containing important buildings inside and attract large population every day.

Figure 2.12. Civic Street, San Francisco, USA (URL2)

Residential streets: street among residence units and neighborhood areas (Figure 2.13).

Figure 2.13. Residential Streets, Honululu City, USA (URL2)

Commercial Streets: streets in commercial centers and commercial based activities (Figure 2.14).

Figure 2.14. Commercial Street, China (URL2)

Multi-Use Streets: those streets which are including more than one function (Figure 2.15).

Figure 2.15. Multi-use Street, Toronto City, Canada (URL3)

On the other hand, Calthrope (1993) classified streets based on the pedestrians' point of view which can be described as follows:

Arterial streets: streets with high mobility level for lengthy journeys (Figure 2.16).

Figure 2.16. Arterial Street, USA (URL4)

Commercial streets: streets in commercial centers (Figure 2.17).

Figure 2.17. Commercial Street, China (URL2)

Connector streets: These types of streets accommodate modern and high traffic volume in the city. These streets connect different streets to each other (Figure 2.18).


Figure 2.18. Connector Streets, Ohio, USA (URL3)

Local streets: these types of streets are serving low traffic volumes as pedestrians based environment (Figure 2.19).

Figure 2.19. Local Street, Berkeley Downtown, USA (URL3)

Alleys: alleys are far from streets serving low moving traffics, parking and sound (Figure 2.20).

Figure 2.20. Elfreth Alley, Philadelphia, USA (URL2)

Under urban morphology, Gehl (2012) mentioned streets classification as:

Covered streets: these types of streets are covered roof streets suitable for pedestrians use under any climate conditions (Figure 2.21).

Figure 2.21. Covered Streets, Nevada, USA (URL2)

Waterways: these are water streets along river canals. These types of streets are mostly observable in cities with so many river canals next to the sea (Figure 2.22).


Figure 2.22. Waterways, Keweenaw Waterways, Michigan, USA (URL2)

Bridge streets: bridges link different streets to different open areas (Figure 2.23).

Figure 2.23. Bridge Street, Queensboro Bridge, Manhattan, USA (URL3)

Boulevards: complex urban streets having the possibility for different speed moods and line space (Figure 2.24).

Figure 2.24. Boulevard, Paris, France (URL2)

Based on urban patterns, Hale (1929) introduced street hierarchy as follow:

Residential streets: these types of streets lead the main street to the residential areas through tiny distance.

Industrial streets: heavy traffic based streets in industrial areas (Figure 2.25);

Figure 2.25. Industrial Street, Harrisburg, UK (URL4)

Main streets: these types of streets are connecting urban areas to others which can hold the heavy and high speed moods to other streets or suburbs (Figure 2.26).

Figure 2.26. Main Street, Salinas, California, USA (URL4)

Park streets: these streets have visual appearance with different surroundings and situations (Figure 2.27).

Figure 2.27. Park Street, California, USA (URL4)

Stair streets: these types are including stairs along the way from one path to other paths (Figure 2.28).

Figure 2.28. Stair Street, Seattle, Washington, USA (URL3)

A boulevard poses a width more than 46 meters including two lines of trees, pedestrian path, benches, and etc. Boulevards have different width, forms and ways such as Boulevards Street, center Median Street, and multi-ways boulevards (Watson et al., 2003). “Pedestrians’ realm” is the distinguishing factor for boulevards to be

known as safe or unsafe ones. Pedestrian realm contains sidewalks, the access road way and planted median. Extended pedestrian realm needs various conditions such as;

- Continuous median between lanes (thorough and access);
- Continuous density tree lines along medians and intersections;
- Availability of narrow access roadway for one lane traffic;
- Providing benches as transit stops to encourage pedestrians to use them;
- Existence of access ways varied from central part to ways.

Construction of boulevards depends on some qualities such as location, usage, context, surrounding building, sign and its boulevards realm and the way through central part, pedestrian realm, trees' rows and spacing, continuous three line medians, lane width, parking, public transportation, traffic control, intersection design, separating road ways, and discouraging "mid-block jay walking" (Watson et al., 2003). Street lane is defined by its width, type, curvature and position to the cars (Sparbart, Dietmayer, and Streller, 2001).

2.5 Summary of the Chapter

The second chapter presented a theoretical background on streets and how these public open spaces should be designed to be more pedestrian friendly. Starting with the spread of motorized transportation, and break away from the traditional city, the modern street lost its attractiveness for the pedestrian, mostly becoming the domain of cars. Legibility as one of the components of urban design criteria was researched in depth to create a checklist on what makes a city, in specific, a street more graspable so that people can easily orient themselves in that environment. Additionally a checklist has been formed relating to how optimum street design should be realized in reference to social, functional and physical parameters. The

table 4 summarizes these criteria so in order to form a checklist for the analysis of the case presented in chapter three.

Table 4: Checklist for Physical, Functional and Social Characteristics of Streets

Physical	Functional	Social
• Street form • Street length • Street proportion and enclosure • Street unity • Edge and center in street • Building façades of streets • Microclimate in streets • Sidewalks along the streets • Flooring • Elements of street: 1. Street furniture 2. Artificial lighting 3. Greenery 4. Public art	• Land use along the street (mixed-use and density) • Accessibility in streets • Active-Passive edges	• Human activities and people attendance • Safety in streets • Comfort in streets

Chapter 3

ANALYZING legibility AT STREET SCALE: THE CASE OF ISMET INonu BOULEVARD-FAMAGUSTA

Legibility is a substantial approach of the appreciable quality of urban environment, which play an extremely important role toward increasing the vitality of city. This chapter is an attempt towards the evaluation of legibility at street scale in the city of Famagusta in Northern Cyprus. This requires a quantitative and qualitative analysis to be done through an understanding of theoretical background, site surveying and observation of the case through site mapping, and photography so that an understanding on the level of legibility in Ismet Inonu Boulevard is developed. This will hopefully pinpoint existing problems affecting the level of legibility along an important axis of the city.

3.1 The Case Study: Ismet Inonu Boulevard in Famagusta

Famagusta is a harbor city is located in the east coast of Turkish Republic of North Cyprus in the Eastern Mediterranean Sea with approximately 35,000 residents (2012) (Figure 3.1). This city over its rich history creates the chance to house numerous amazing remains of architectural and cultural heritage of the Island, involving the fortifications which are reflected as one of the most valuable ensembles of medieval architecture throughout the world. Over the centuries, the historical core of the city has been bounded by new forms of urban development, which are extremely different from its historical layout.

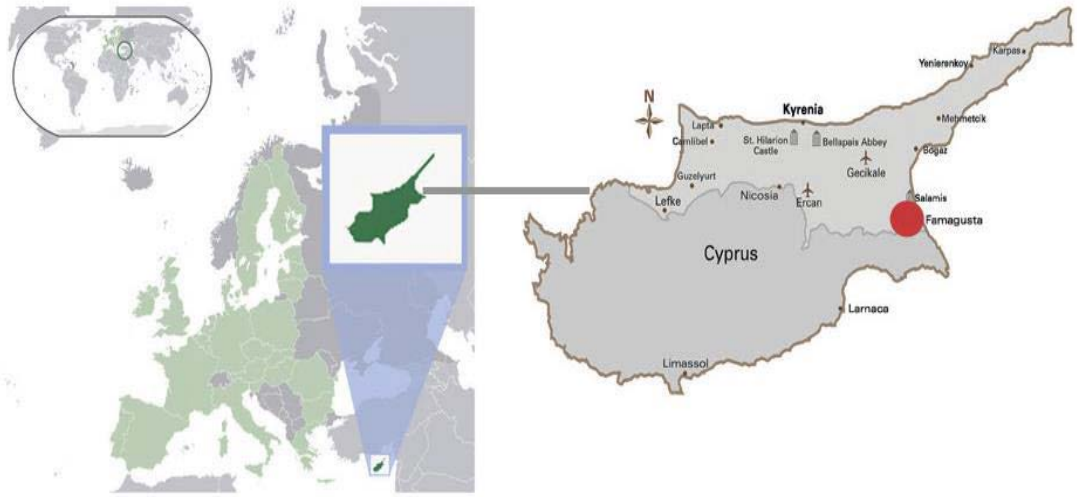


Figure 3.1. The Location of Famagusta City
Source: www.Google.com

Famagusta is known as an educational city in Northern Cyprus where the existence of Eastern Mediterranean University offers a comprehensive learning ground and an economic opportunity for local and international community. The Eastern Mediterranean University, located at one of the newly developing districts of the city of Famagusta is the biggest public university in Northern Cyprus housing a community of local and international students that the total number has now exceeded 10,000 students (emu.com).

The Famagusta city is comprised of several districts which can be summarized as below (Figure 3.2) (Onal, Dağli, and Doratli, 1999):

- The Walled City of Famagusta;
- Maras region —which is a district, has been established mostly by the Greek Cypriots;
- The Maras region —Closed part of Famagusta city since 1974;
- to the north-west of the walled city of Famagusta

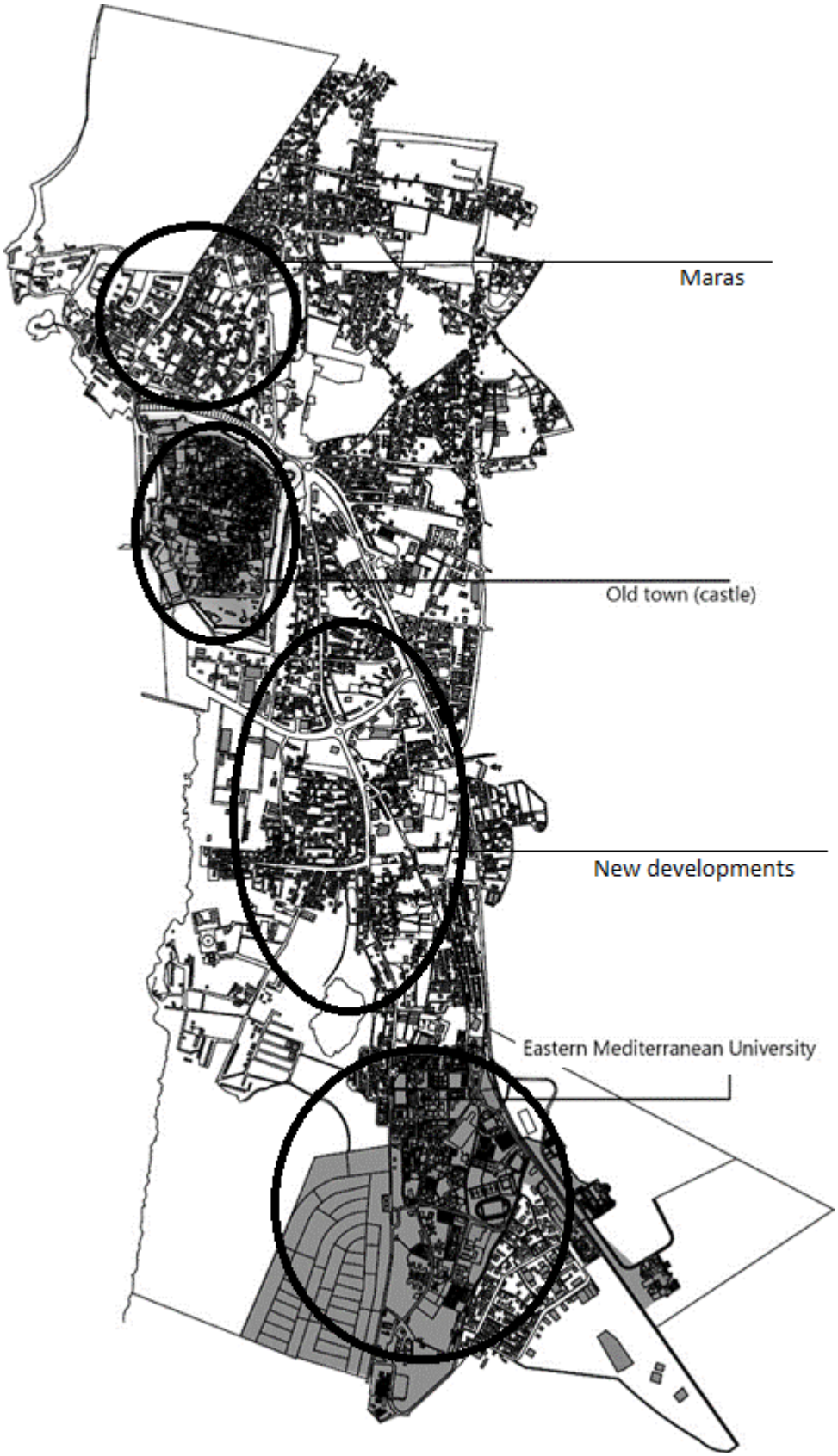


Figure 3.2. Ismet Inonu Boulevard in reference to existing districts
Source: Doratli, Dağli and Onal, 1999, Pp.336

The case study, Ismet Inonu Boulevard is an important axis connecting the vehicular and pedestrian traffic from the University to the old city through Toros and Zafer Aniti roundabouts which are two important traffic junctions in the city. The Ismet Inonu Boulevard also known locally as Salamis Street houses social and commercial events in the Famagusta city due to its proximity to the University campus. After the establishment of the University in 1980s, this road developed into an important axis where many shops and restaurants were launched to serve the international community living within the borders of the University Campus. Another important role of this avenue comes from its connecting function to another important residential district, Tuzla and the town of Iskele. Also being an access road to many beaches on the western coast, increases the importance and therefore density of its use (Figure 3.3).

For the convenience of the research, the Ismet Inonu Boulevard is divided into three sections which can be described as follows (Figure 3.3):

Section 1: The part in between Toros traffic junction next to Osman Fazil Pasha Mosque and Zafer Aniti roundabout close to the old city.

Section 2: The part in between the high-rise building at the entrance of Gulseren district and Toros traffic junction next to Osman Fazil Pasha Mosque.

Section 3- The part in between the square in front of the EMU up to the high-rise building at the entrance of Gulseren district.

These subdivisions were made according to the activity patterns and physical characteristics of the area. The reason for choosing Ismet Inonu Boulevard as the case of this study was such that it serves as a major street that cuts through the city; and it acts as a distinct landmark for the city, and is the key rallying point for social and economic activities within the Famagusta city. A major significant commercial center along this road which is well known to all is Lemar, a retail complex, besides, the street contains several other places where people can meet and socialize. This include cafes, restaurants, boutiques, etc. Besides, the street serves for both pedestrians and vehicles.

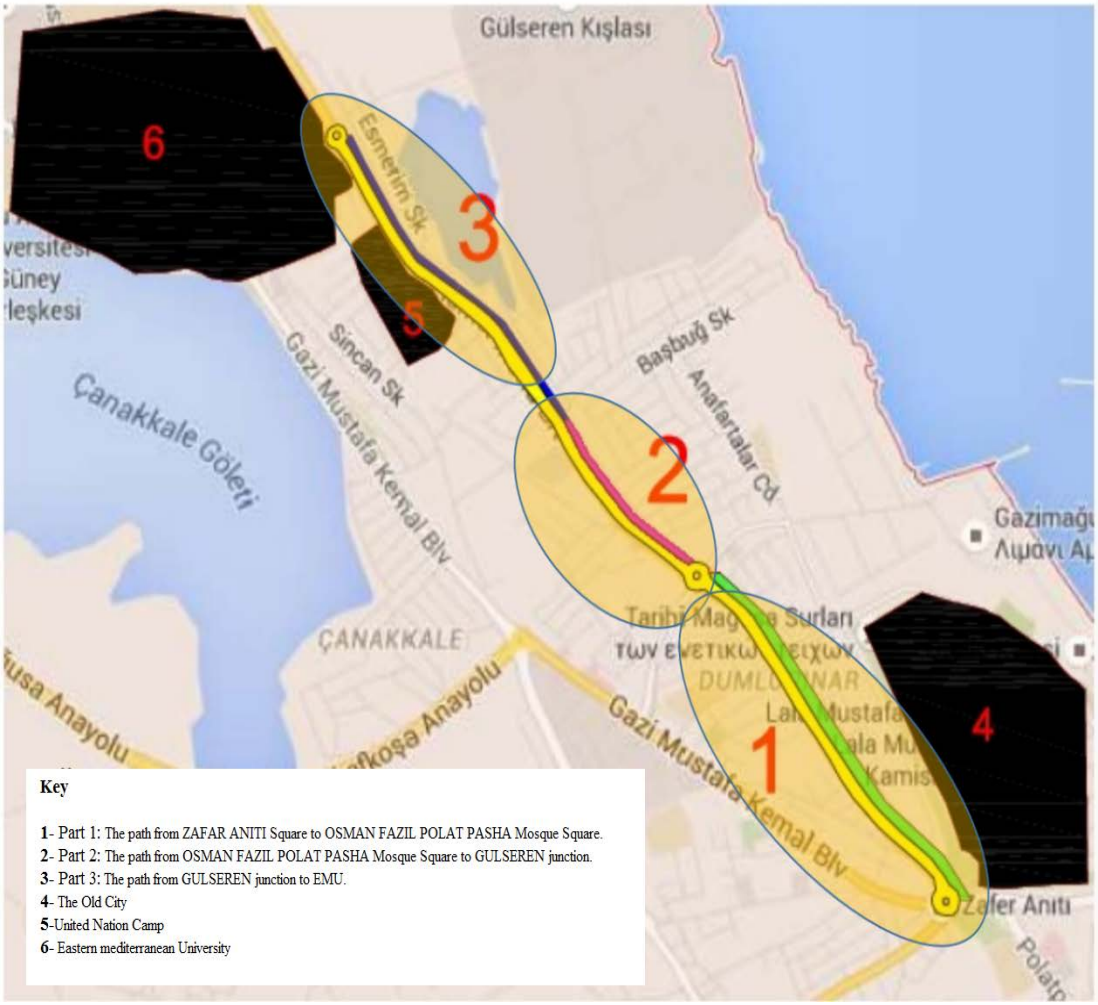


Figure 3.3. The Map showing the study area in Section 1-2 and 3, Famagusta, Northern Cyprus, KKTC

Accordingly, the evaluation of the case study is realized in three consecutive sections as aforementioned. Although the boulevard comprises various facilities such as restaurants, cafes and supermarkets such as Lemar and Onder Supermarket which add to the importance and vitality of this street, the most lively part of the boulevard is section 3, the axis extending from the entrance of the University to the high rise building at the entrance of Gulseren district

As far as the location of Ismet Inonu Boulevard is concerned, it has a connecting function, bridging between historical town and new developing part of Famagusta. There are various factors which add to the importance of this street such as being a connection pathway between the city of Nicosia and Karpaz area, as well as acting as a major pedestrian pathway connecting the University and the old town. Besides its role as a connector, Ismet Inonu Boulevard also accommodates houses, supermarkets, many shops and various other activities that draw people to the area. Osman Fazil Pasha Mosque and EMU are amongst the main landmarks. Availability of retail complexes such as Lemar, along the path help create an active edge along the road. Figure 3.5 displays section 1 of the case study area in figure-ground map; and a section from the pathway is presented in figure 3.6.

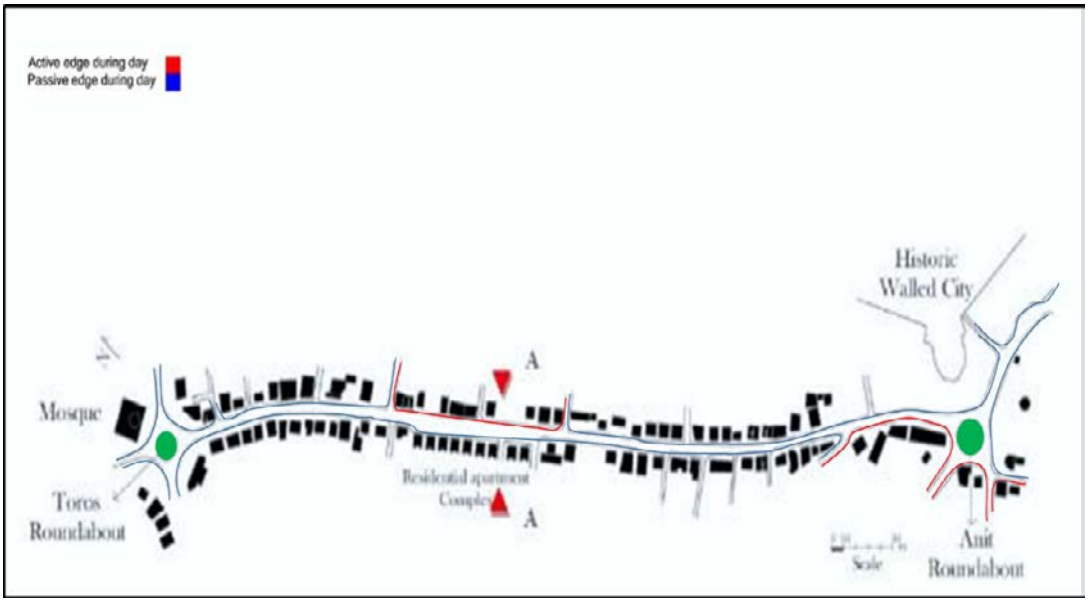


Figure 3.5 The figure-ground map showing Section 1 of the case study area

Figure 3.6. Section A-A from Section 1 of the Study Area

Figure 3.8. The figure-ground map showing Section 2 and 3 of the case study area

Figure 3.9. Section B-B from Section 2 of the Study Area

Figure 3.10. Section C-C from Section 3 of the Study Area

3.2 Data Collection Techniques

Legibility as the mental image of the city defines the readability and visual quality of the city by its citizens and visitors. Legibility is the apparent clarity of the cityscapes meaning the easiness in grasping the pattern through recognizable symbols such as districts, landmarks, paths, edges and nodes (Lynch, 1974). Under legibility ideology, the city is considered by its inhabitants' perception and image rather than the city as itself.

Based on this framework, this research makes use of a similar approach in its data collection, utilizing cognitive maps and surveys to evaluate legibility on the grounds of user perception.

Using mentioned series of techniques such as direct observations through photography and mapping, cognitive mapping, interviews and questioners, the research collects the necessary data for the analysis of the case. Photography process was done through the first weeks of December, 2016.The study focus is based on physical, functional and social characteristics of streets as well as elements of

legibility. The focus of this research is in the newly developing quarters which is located at the central part of the city (Figure 3.5).

After designing the questionnaire and translating the English version into Turkish, 10 questionnaires had been distributed among students as part of pilot study to test the level of understanding and clarity of questions' meanings. Then, 150 structured questionnaires were distributed among the locals and students of EMU using both English and Turkish versions during January, 2015. This total number of sample size represents 0.1% of the population of Famagusta .Each respondent was given 15 minutes to answer the questions, but sometimes when the respondents were not willing to respond in the street, the researcher asked the questions orally and filled the questionnaire based on the respondent's answers. At the end, 148 questionnaires were collected with a response rate of 98.66%. The data was inserted into excel programs one by one and then analyzed through SPSS by the help of predefined formulas and factors.

The collected data from distributed questionnaires has been analyzed through SPSS 22.0 VS. Statistical analysis was conducted using two main methods. First one involves the use of a generalized spreadsheet or data management program such as MS Excel and second one comprises the use of a specialized statistical package such as SPSS. SPSS helps quicken data analysis because the program knows the location of the cases and variables. SPSS is specifically made for analyzing statistical data and thus it offers a great range of methods, graphs and charts. SPSS is designed to make certain that the output is kept separate from data itself.

Demographic profile of the respondents is shown in the following tables. The data for this table is directly collected from SPSS report (Table 3.1).

Table 3.1 Demographic Variables of Respondents

Value		Frequency	Percent
Gender	Male	71	48.0
	Female	77	52.0
Age	13-18 years old	41	27.7
	19-24 years old	41	27.7
	25-34 years old	31	20.9
	35-50 years old	21	14.2
	51-64 years old	14	9.5
	Total	148	100.0
Nationality	Turkish Cypriot	50	33.8
	Turkish	68	45.9
	Other	30	20.3
Place of Living	Walled city	6	4.1
	Baykal	12	8.1
	Gulseren	23	15.5
	Karakol	29	19.6
	Sakarya	61	41.2
	EMU campus	14	9.5
	Other	3	2.0
	Total	148	100.0

Based on this table, 48% of the respondents were male while 52% were female. About 70% of the respondents are aged between 13 to 34 years old. 45.9% of the respondents were from Turkey, 35.8% were Turkish Cypriot while 20.3% were from other countries. More than 70 % of the respondents were living in Sakarya, Karakol and Gulseren (41.2%, 19.6% and 15.5%). 9.5% of the respondents were living in EMU campus (Table 3.1).

Accordingly, both quantitative and qualitative technics have been used to collect the complete and concise information in representing the case. Qualitative data was

supported by theoretical background and referenced information in the second chapter of the study while quantitative data has been obtained through the analysis of numerical data.

In this regard, a survey has been done to learn the opinion of permanent citizens, people of Famagusta and temporary population, international students of EMU about physical, functional and social dimensions of existing situation relating to legibility of the selected case study. In addition, this questionnaire analysis has been utilized to discover the level of physical quality of the built urban environment in this part of the city. Besides, this opportunity has been used for to build up data relating to the emotions of users from all aspects which have an effect on the level of legibility in this area. The total distance of study area in between the new town and the old town of Famagusta is approximately 3.25 km (Figure 3.5).

The data obtained from questionnaires' results have been evaluated using specified statistical approaches to reach to concrete results. Furthermore, behavioral and visual (photography) observation have been used to strengthen the results of the questionnaires. The behavioral observation is usually used in social researches, as these methods help researchers record the reaction of users.

As part of the data collection approach, visual observation has also been used to record the existing physical situation in the selected area.

Using above data collection techniques, following elements of legibility and their related physical dimensions will be analyzed in detail:

- Districts,

- Landmarks,
- Paths,
- Nodes,
- Edges.

3.3. Analysis of Districts

As has been mentioned in previous part of this research, district is one of the elements which have an effect on the level of legibility in urban environments. Districts can be described as large areas which have unique and distinct physical characteristics. They can have their own special typography of building types, details, shape, and texture.

Ismet Inonu Boulevard has a mix of residential areas with set of shops and restaurants. Although most of them has been already distinguished by their own advertisement billboards they share the same structure or even space as residential or commercial areas. Most of the restaurants and coffee shops have open or semi-open spaces in front of their entrance doors to service the customers but with their distinguishable color and concept of advertising and service but mostly same concept of foods and drinks. Boutiques along the boulevard cover wide numbers of Turkish and foreign brands, but mostly share the same level of pricing as well as clothing style. The zoning map in Figure 3.6 help us identify the boulevard in districts and also divide the study area into manageable sections to work on.

Figure 3.6. Districts/Zones along Ismet Inonu Boulevard

Figure 3.7. Focal Points in Section 1 of the Study Area

Figure 3.6 represents focal points highlighted by questioners and cognitive maps

along section 1 of the study area.

Figure 3.7. Focal Points along Ismet Inonu Boulevard showing section 2 and 3 of the study area.

Figure 3.7 presents the second part of the study area starting from Lemar supermarket up to Osman Fazli Pasha Mosque which is the newly developing part of the city.

Although there are plenty of functions available especially along section 2, nonetheless there is no special features about these shops that make them memorable to the users. Due to the existence of the United Nations camp along section 2, there is a lack of continuity in relation to active edge. However, the existence of focal points in section 1, 2 and 3 help the users perceive the boulevard in districts. It is observed from the interviews that many describe location in relation to these focal points or in some cases districts such as the United Nations Camp.

Figure 3.8. United Nations Camp on the right hand side: Area perceived as district.

3.4 Analysis of Landmarks

Another urban element which plays a crucial role in legibility of urban environment and directly helps residents to find their way and location is landmark. A landmark is a recognizable natural or artificial feature used for navigation, a feature that stands out from its near environment and is often visible from long distances. Landmarks are usually considered when answering the question: '*Where am I*?'. They are essential when determining how one can find his/her directions; and provide a

vocabulary for direction givers (Klippel & Winter, 2005; Weissensteiner & Winter, 2005). However, these are landmarks acting as markers. They might be substituted by signs, graphics or indicators but what really interests this research is understanding their profound significance within the urban form.

The Osman Fazil Polat Pasha mosque was the most well-known reference point for the users. It was observed that almost everyone interviewed knew about this mosque and it was used to describe directions. Due to its function, location and proportions, Osman Fazil Polat Pasa Mosque can definitely be categorized as a landmark along this axis. (Figure 3.10).

Figure 3.9. Showing Landmarks and focal points along the study area

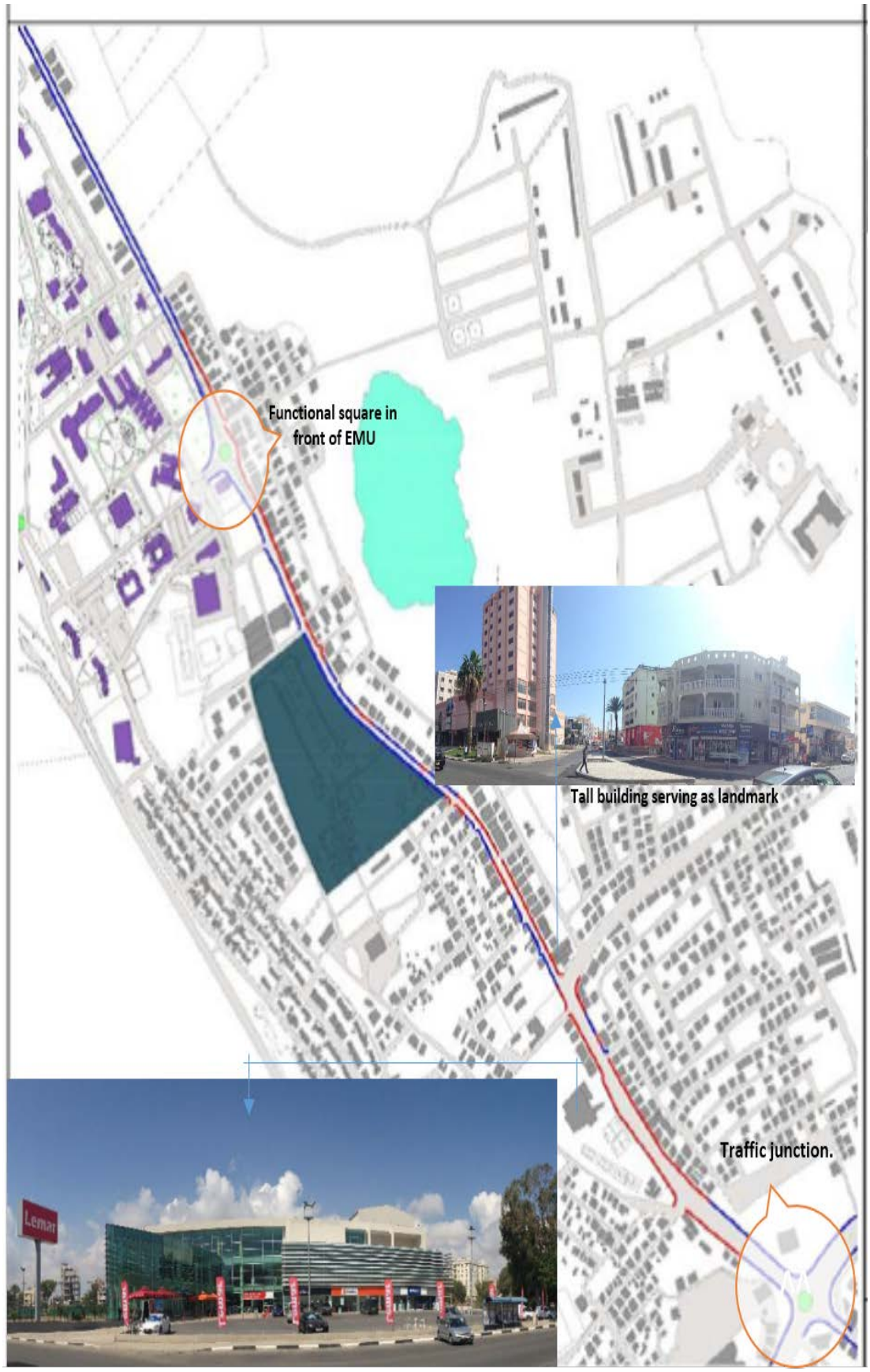


Figure 3.10. Lemar supermarket, a focal points along Ismet Inonu Boulevard.

Figure 3.11. Osman Fazil Polat Pasha Mosque: Landmark in the city

Besides, landmarks focal points are also important reference point which help people orient themselves in an environments. Although Lemar Supermarket does not have the same significance as the mosque, nonetheless, due to its function Lema Supermarket is well known to all interviewed inhabitants. The existence of landmarks and focal points along Ismet Inonu Boulevard attract people to the street. It is observed that these elements play an important role especially in the daily life of students as they act as gathering/socializing points for them. They also help tourist find their way around the city especially if they are visiting the city for the first time. (Figure 3.11).

3.5 Analysis of Paths

As it has been mentioned previously, paths are one of the fundamental elements in an urban environment which play an import role in the legibility and livability of the city. Besides, it should be mentioned that paths provide an opportunity for further

development of urban environments. Paths can be divided to two types, vehicular paths and pedestrian paths.

Ismet Inonu Boulevard in general act as a primary vehicular and pedestrian road. As a vehicular pat, it possesses good quality roads, however for the pedestrians it does not serve equal opportunities. Figure 3.12 shows secondary roads connecting to Ismet Inonu Boulevard. Although the distances in between the secondary roads presents walkable distances, nonetheless the lack of semi open spaces along this route, does not make this road attractive for the users. It is observed that people usually prefer to drive to the area rather than reaching this area by foot.

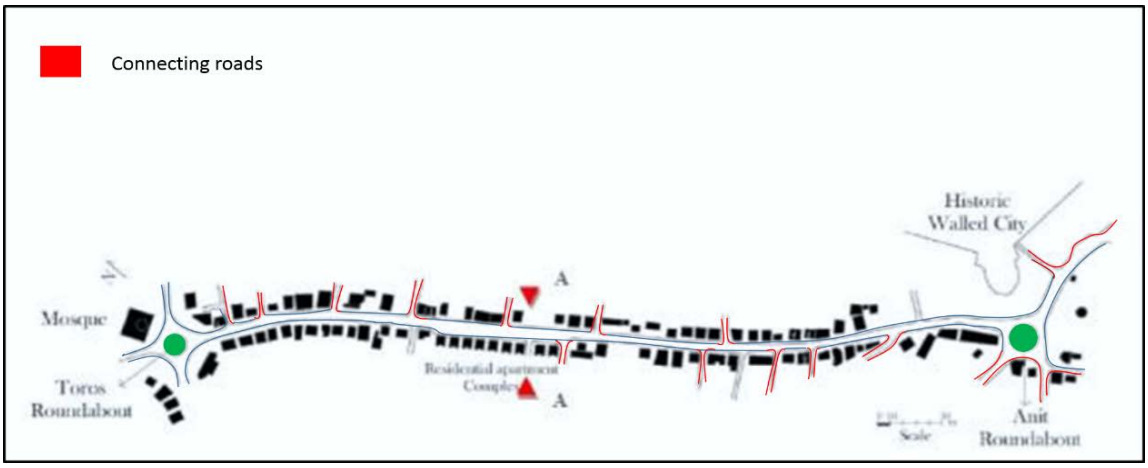


Figure 3.12. Secondary roads (section 1) connecting to Ismet Inonu Boulevard

Moreover, the pedestrian paths along the boulevard are in very bad condition and their continuity is disrupted. Besides offering no opportunities for the continuation of pedestrian movement, sidewalks are also unmaintained areas decreasing the possibility of attracting people to the area. It is observed that there are holes in the pavements and they are built in very different heights. The pavements are not designed for disabled people making it rather difficult for people with disabilities to

access to the facilities offered by the boulevard. The unsuitable materials used in the making of pavements later caused a lot of problems especially in the maintenance of the sidewalks. (Figure 3.13).

Figure 3.13. Lack of suitable sidewalks and pavements along Ismet Inonu Boulevard

The front of shops have also been personalized by the owners in order to create sitting areas for customers or displaying of products. Although this has attracted more people to the area, lack of uniformity in the organization of outdoor spaces created other visual and physical problems along the study area. Due to inconveniences caused by the claiming of outdoor spaces, width of sidewalks have become narrower hardly giving space for even one person. As also visible from the site section presented in Figure 3.14, the width of sidewalks is different on two sides of the boulevard due to the claiming of public open space by the shop owners.

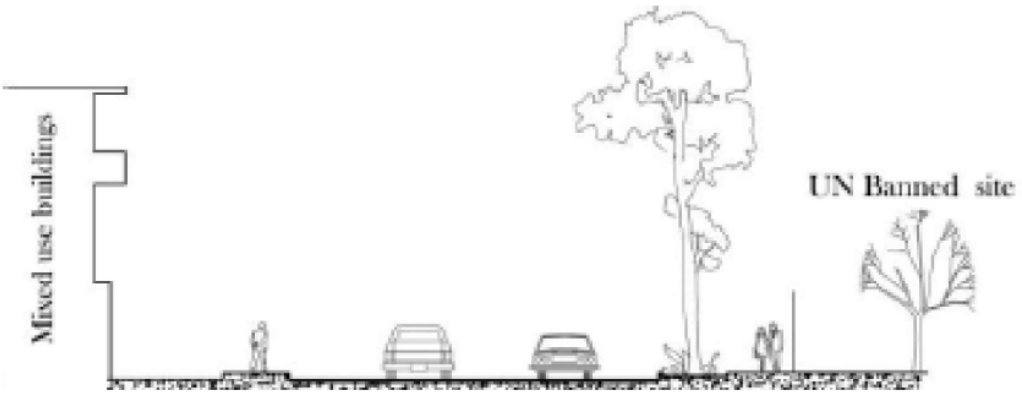


Figure 3.14. Section showing tight pedestrian walk way.

In addition to damaged surfaces, height irregularities and differentiation, sidewalks have also been blocked by trash and shop wastes and construction materials as displayed in Figure 3.15.

Figure 3.15. Sidewalks occupied by trash and other waste materials

3.6 Analysis of Nodes

Nodes are urban elements that help people orient themselves in a city. They can be public open spaces with or without a landmark. Although there are potential areas for becoming nodes such as Zafer Aniti and Toros roundabouts, nonetheless due to the existing transportation system, they only serve to vehicular traffic where

pedestrians cannot access. Although they serve the purpose orienting people in terms of wayfinding, they are not designed for the pedestrian. Similarly, the new retail complex, Lemar, has an open space in front of its entrance, yet due to dedicating that space to car parking, another opportunity has been missed out. Despite having residential areas surrounding the boulevard, there is hardly any open space available for public use which can be identified as a node.

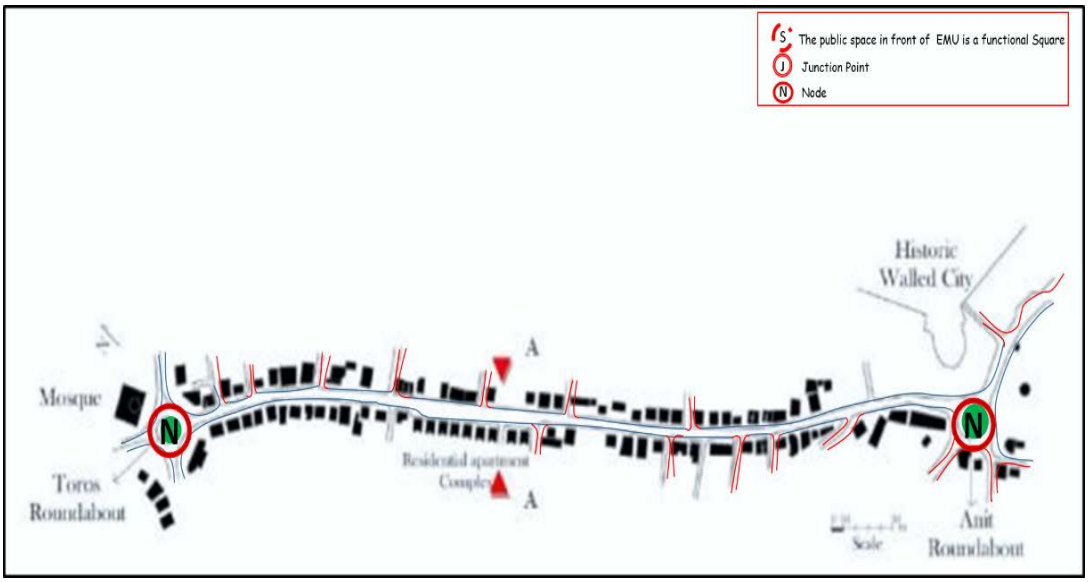


Figure 3.16. Traffic nodes along Ismet Inonu Boulevard.

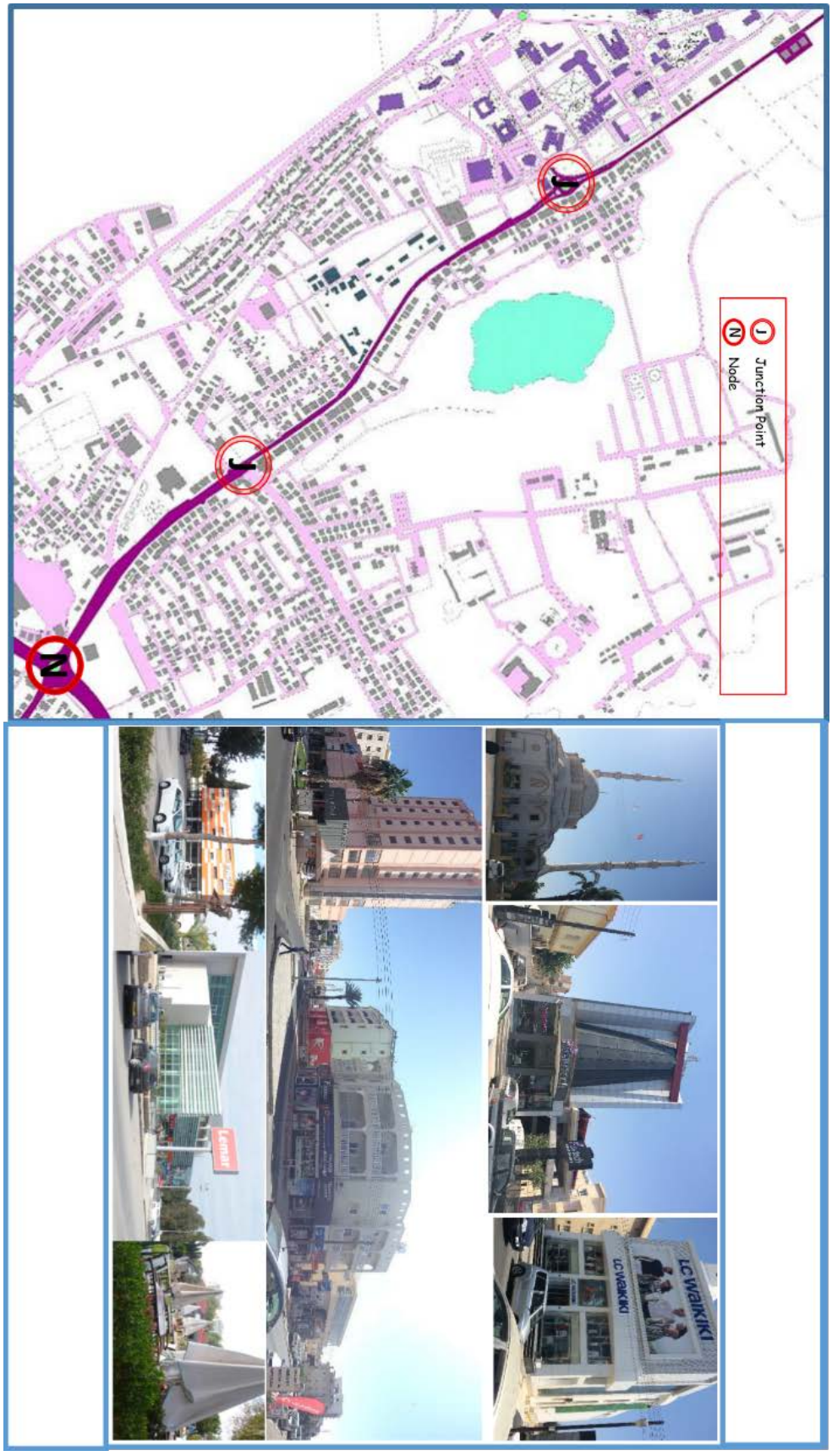


Figure 3.17. Pictures showing existing traffic nodes

Nodes which have important roles in creating a legible city can therefore have two functions. They can be either pedestrian nodes or vehicular nodes. Pedestrian nodes are parks, gathering areas, plazas and recreational areas.

Vehicular nodes on the other hand are traffic junctions for accommodating cars such as Toros and Zafer Aniti roundabouts as in this case. Although there are several nodes highlighted in the interviews and cognitive maps such as the fronts of Magem, Lemar Complex, and Osman Fazil Polat Pasha Mosque, nonetheless they cannot be considered as properly designed squares for the people of Famagusta. If they are adapted to serve public use, these potential open spaces may help increase the movability of individuals, helping to the overall vitality of the street. Figure 3.18 displays a close plan view of these potential open spaces which are now acting as vehicular nodes.

Figure 3.18. Nodes in Ismet Inonu Boulevard

3.7 Analysis of Edges

In the previous section the importance of edges was stated as the existence of a hierarchy of private, semi-public and public spaces where people can display different functions. This can be studied by looking at the street as active and passive edges. Active edges are those that offer people various opportunities both during the day and night, making that space usable during all times. On the other hand, passive edges are those that construct no connection with street's user and they offer not enough functions to make the street livable.

Active and passive edges in a street are directly related to functions along a street. According to functional analysis, Ismet Inonu Boulevard as a whole works as a mixed use street due to the existence of incompatible uses. In some parts of the street, the continuity of facilities are interrupted helping towards the formation of passive edges. Based on the observations, it can be stated that Ismet Inonu Boulevard is mostly an active street during day time. However, at night time except from the sections where restaurants and cafes exist on the street edge, the other parts are almost passive (Figure 3.19, 3.20). This shows that functions type plays an important role in street livability and legibility. Therefore, and in order to have more livable and legible street, there is a need to have appropriate functions for attracting people to visit the street in various ways and times. Restaurants and cafes and in general eating and drinking facilities along Ismet Inonu Boulevard create a welcoming edge to the users during day and night time. This adds to the formation of an active edge f while boutiques with more limited working hours make active edges only during the day time. In order to have a visual image of active and passive edges along the street, two separated maps which shows the active and passive edges during the day and at

night time are prepared by observing street in various days and nights during the week days and at weekends.

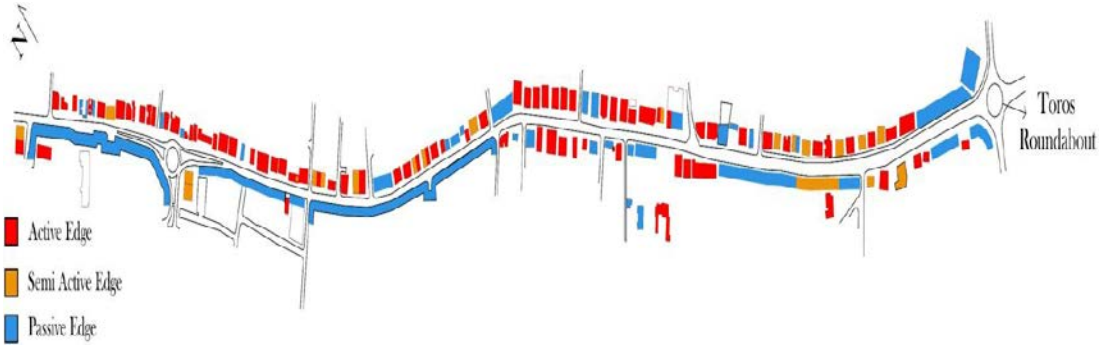


Figure 3.19.The Ismet Inonu Boulevard in terms of activity during day time

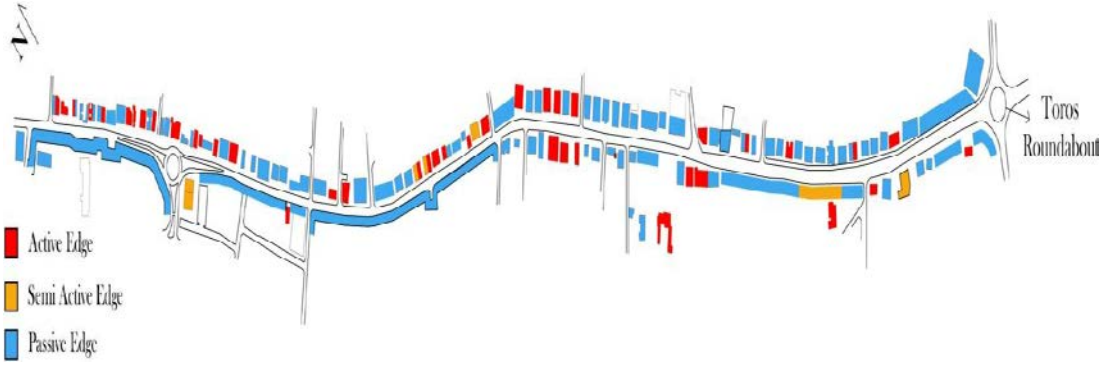


Figure 3.20. The Ismet Inonu Boulevard in terms of activity during night time

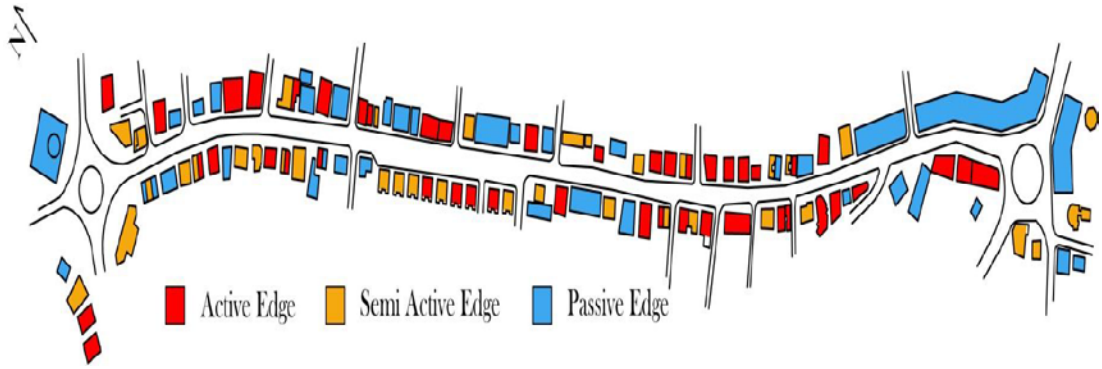


Figure 3.21. Activity on the edge of the street during day time

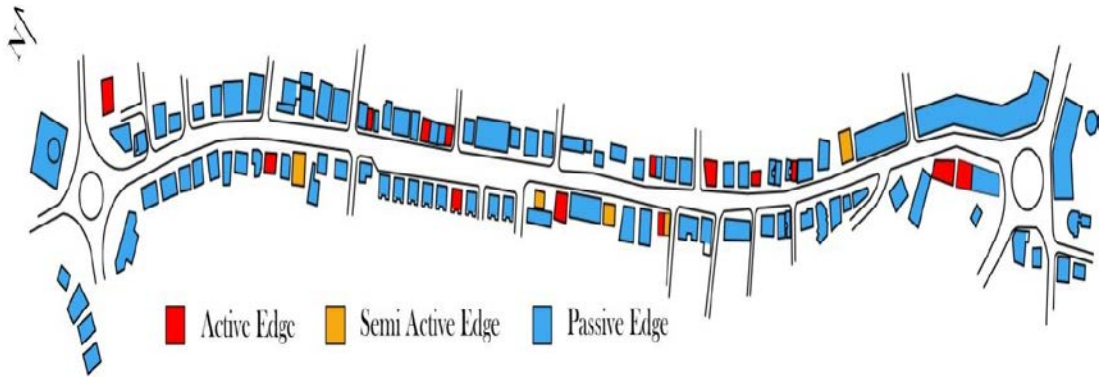


Figure 3.21.Activity on the edge of the street during night time

Figure 3.19 presents all active edges along the third section of the case study. The remaining are passive edges, which do not provide appropriate functions to attract people there. Based on figures 3.6, 3.7, 3.8 and 3.16, it can be stated that the buildings' height, facades, colors, size and forms are all different in appearance and concept. This destroys the uniformity which brings harmony in public open space and decrease the attention and motivation of the inhabitants to use that space.

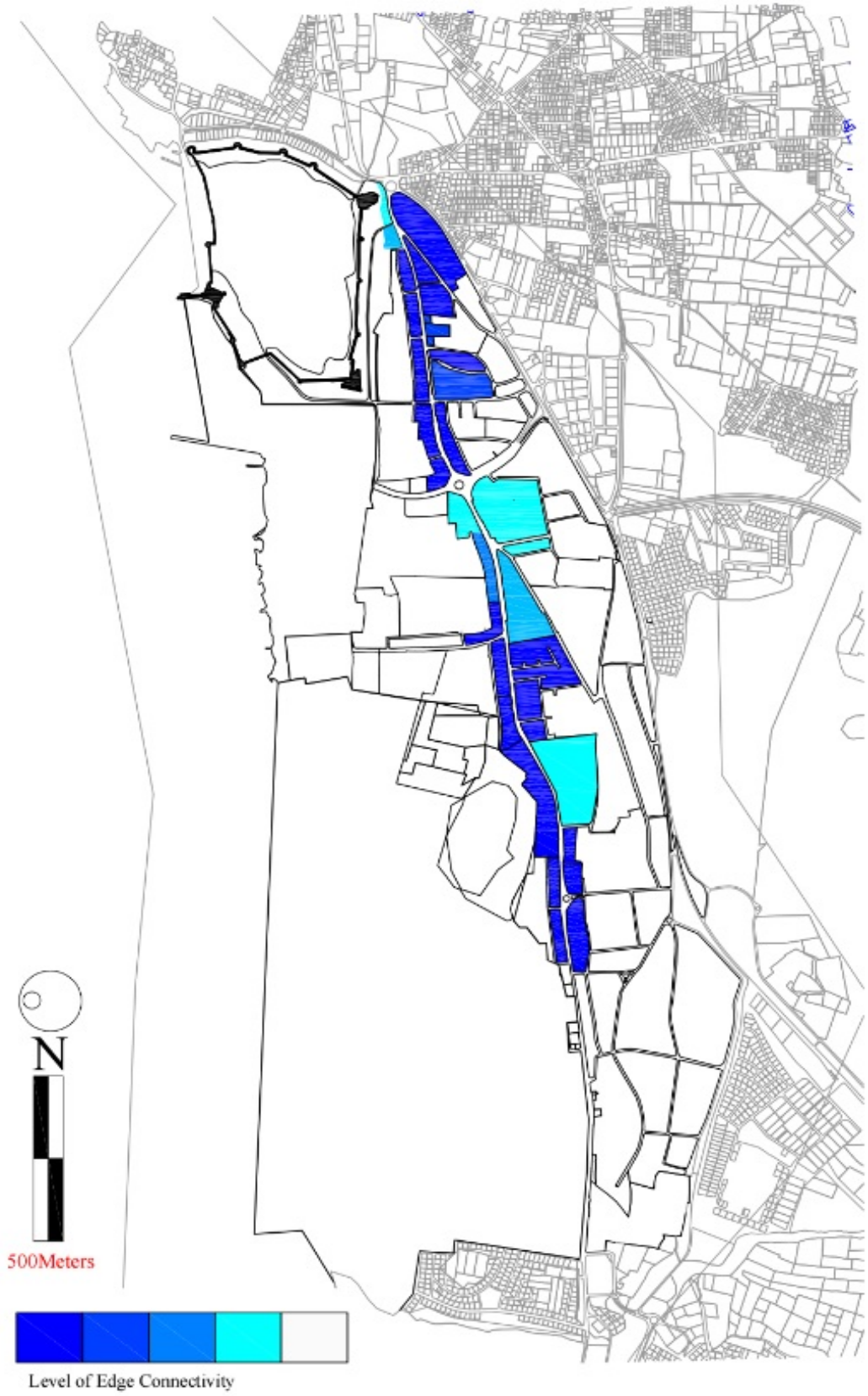


Figure3.19. Edges along Ismet Inonu Boulevard

3.7.1 Street Signs and Street Furniture

There are many different types of street furniture such as sitting elements, bins, etc. Signs are also placed in this category. There are lots of bins stationed along the street which most of them are either in very poor condition or placed improperly. The street image is damaged by the poor conditions of garbage disposals and movable bins which create an ugly picture of Ismet Inonu Boulevard. In general, the designation and placement of these waste disposals are improper which leads to unclean and unhealthy atmosphere (Figure 3.20, 3.21).

Figure 3.22. The bin placement of the street

Figure 3.23. The Garbage Disposal

Another element of street furniture is the sitting elements which the street heavily lacks. There are not enough seats especially in busy hours for people waiting for the buses and the only seats available to pedestrians are in bus stops which are few in number, not to mention their poor quality and poorly maintained bus stops. Lack of public benches is evident and seats which are exclusive to restaurants and bars across the street are available (Figure 3.22).

Figure 3.24. Bus stops along the street, personal Photography

According to questionnaire results 28.4% of respondents rated the sitting elements as poor, 35.8% fair, and 22.3% did not have an opinion on this matter, 8.1% as good, and 5.4% as excellent. It can be understood from both results and observation that Ismet Inonu Boulevard lacks the required amount of sitting elements for street users. People who have to wait for the buses or those who want to take a rest from walking in the street need proper seats and benches for experiencing the Ismet Inonu Boulevard. (Table 3.2).

Table 3.2. Interview Results for Sitting Elements along Ismet Inonu Boulevard

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	42	28.4	28.4	28.4
	Fair	53	35.8	35.8	64.2
	No idea	33	22.3	22.3	86.5
	Good	12	8.1	8.1	94.6
	Excellent	8	5.4	5.4	100.0
	Total	148	100.0	100.0	

The signs are other important street elements which are found in abundance in this case. The street signs diverse into different categories such as advertisement billboards, terrific signs and landmark signs all which in turn increase the awareness of street users whether they are drivers or pedestrians. There are a lot of different signs existing along Ismet Inonu Boulevard. The observations reveal that signs are somewhat in between sufficient and insufficient. Although Ismet Inonu Boulevard is a primary road leading to the center and old part of the city, there are not many signs showing all leading destinations. There is only a few leading signs available but somehow they are not very legible for new drivers. They are also in poor condition and because of hot and humid weather, most of these signs are damaged and are in need of constant repair which makes them unreadable from a distance. Yet, more importantly it shows vague and sometimes wrong information about what is ahead (Figure 3.2). Along Ismet Inonu Boulevard, one comes across with four traffic signs.

Figure 3.25. Street Signs in Section 1 of the Case Study

Their placement is also questionable as some are perched together. The street names are non-existent and the billboards and advertisement signs are placed either too high or too low and form a messy collection of signs. The historical buildings existing in the old city are not sign posted as they should be, yet new buildings possess better signs indicating their names. People looking for historical buildings usually find it difficult to navigate themselves and usually have to ask others about the location.(Figure 3.25).

Figure 3.26. Street Signs in the Section 2 of the Study Area

According to results 24.3% of respondents rated the signs as poor, 23% as fair, and 29.1% had no idea, 16.9% as good, and 6.8% as excellent. (Table 3.24).

Table 3.3. Rating of Signs in Salamis Road

		Frequency	Percent
Valid	Poor	36	24.3
	Fair	34	23.0
	No idea	43	29.1
	Good	25	16.9
	Excellent	10	6.8
	Total	148	100.0

According to the results of questionnaires, 27.7% rated the number of street signs as poor, 37.8% as fair, 18.2% had no idea, 10.8% as good, and 5.4% as excellent. The results and observations show that the number of street signs are not enough to guide the passerby and street users. Amongst these are traffic signs, landmark signs and street signs. Having adequate number of signs will make it easier for the pedestrians help to navigate themselves along the street which will increase their awareness on the environment (Table 3.4).

Table 3.4. The Adequacy of Number of Street Signs in Ismet Inonu Blvd.

		Frequency	Percent
Valid	Poor	41	27.7
	Fair	56	37.8
	No idea	27	18.2
	Good	16	10.8
	Excellent	8	5.4
	Total	148	100.0

According to results, 4.7% rated the size of signs as poor, 8.8% as fair, 26.4% had no idea, 39.9% as good, and 20.3% as excellent. The results shows that the size of signs

are enough for people to comprehend and understand them from a distance which is a positive factor in guiding street users to their destinations (Table 3.5).

Table 3.5. The Visibility of Street Signs in Ismet Inonu Blvd.

		Frequency	Percent
Valid	Poor	7	4.7
	Fair	13	8.8
	No idea	39	26.4
	Good	59	39.9
	Excellent	30	20.3
	Total	148	100.0

According to data results, 37.2% of respondents rated the placement of street signs as poor, 31.8% as fair, and 16.9% had no idea, 11.5% as good, and 2.7 as excellent. The observations and results of the survey indicate that the placement of many signs are not right and are either improperly placed or many areas needed their own signs to indicate the required information for street users. Another factor which must be taken into consideration for signs is their placement and color. As stated before some signs are either placed very high or very low or there are no signs at all to help people and street users navigate the street or quickly get information from the signs (Table 3.6).

Table 3.6. Number of Street Signs in Ismet Inonu Blvd.

		Frequency	Percent
Valid	Poor	55	37.2
	Fair	47	31.8
	No idea	25	16.9
	Good	17	11.5
	Excellent	4	2.7
	Total	148	100.0

The results shows that 38.5% of respondents rated the physical condition of signs as poor, 25% as fair, and 24.4% had no idea, 9.5% as good, and 2.7 as excellent. The results and observations show that they are in poor condition and because of hot and humid weather, the signs are damaged and are in need of constant repair which makes some of them unreadable from a distance (Table 3.7).

Table 3.7. The Physical Condition of Street Signs in Ismet Inonu Blvd.

		Frequency	Percent
Valid	Poor	57	38.5
	Fair	37	25.0
	No idea	36	24.3
	Good	14	9.5
	Excellent	4	2.7
	Total	148	100.0

According to the results, 36% of the respondents rated the number of street sign types as poor, 24.3% as fair, 21.6% had no idea, 14.9% as good, and 2.7% as excellent. The results show that there are not enough street sign types to increase the awareness of users. These types range from traffic signs which show the required amount of speed, distance to destinations, what kind of landmark and which landmark is closer, and the closest petrol station and advertisement billboards. The diversity in sign types are essential as street users need different information to decide what and how they want to do in the street (Table 3.8).

Table 3.8. Sign types in Ismet Inonu Blvd.

		Frequency	Percent
Valid	Poor	54	36.5
	Fair	36	24.3
	No idea	32	21.6
	Good	22	14.9
	Excellent	4	2.7
	Total	148	100.0

According to results, 29.7 % respondents very much disagree with signs as they think they destroy the attractiveness of the street and city due to improper design, usage and types, 37.2% disagree, 17.6% had no idea, 8.8% agree, and 6.8% very much agree. It is understood that a well-designed street, should adequately contain information signs that help create awareness and bring attractiveness to the street. While signs play an important role in informing the street users with different information they can help and add to street attractiveness and prestige (Table 3.9).

Table 3.9. Street Signs adding/destroying the Attractiveness of Ismet Inonu Blvd.

		Frequency	Percent
Valid	Very much disagree	44	29.7
	disagree	55	37.2
	No idea	26	17.6
	agree	13	8.8
	very much agree	10	6.8
	Total	148	100.0

According to results, 52% of respondents said that the entrances to Ismet Inonu Boulevard is adequate and 48% answered as inadequate. According to literature reviewed, the number of entrances to a street can contribute to the condition of traffic in the street and by having fewer entrances the intensity of traffic can sometimes

progress slower and help the street users decide more easily whether they want to enter or exit the street (Table 3.10).

Table 3.10. Adequacy of existing entrance points of cars to Ismet Inuno Blvd.

		Frequency	Percent
Valid	Yes	77	52.0
	No	71	48.0
	Total	148	100.0

3.8 Summary of the Chapter

Along the case study area, edge of the street is defined with a mixture of buildings with different concepts, height, and size. This affects the legibility of the street and destroys the readability for readers (Figure 3.25).Moreover, sidewalk width along the Ismet Inonu Boulevard changes between 70 cm to 130 cm, creating not enough space for more than 1-2 pedestrian walk side by side. The facades along the street are all contemporary, giving no taste of the culture, or any hints on social and historical background of the city. Due to differences in façade styles, proportions, etc. there is a lack of street unity along Ismet Inonu Boulevard as can be seen in figure 3.27

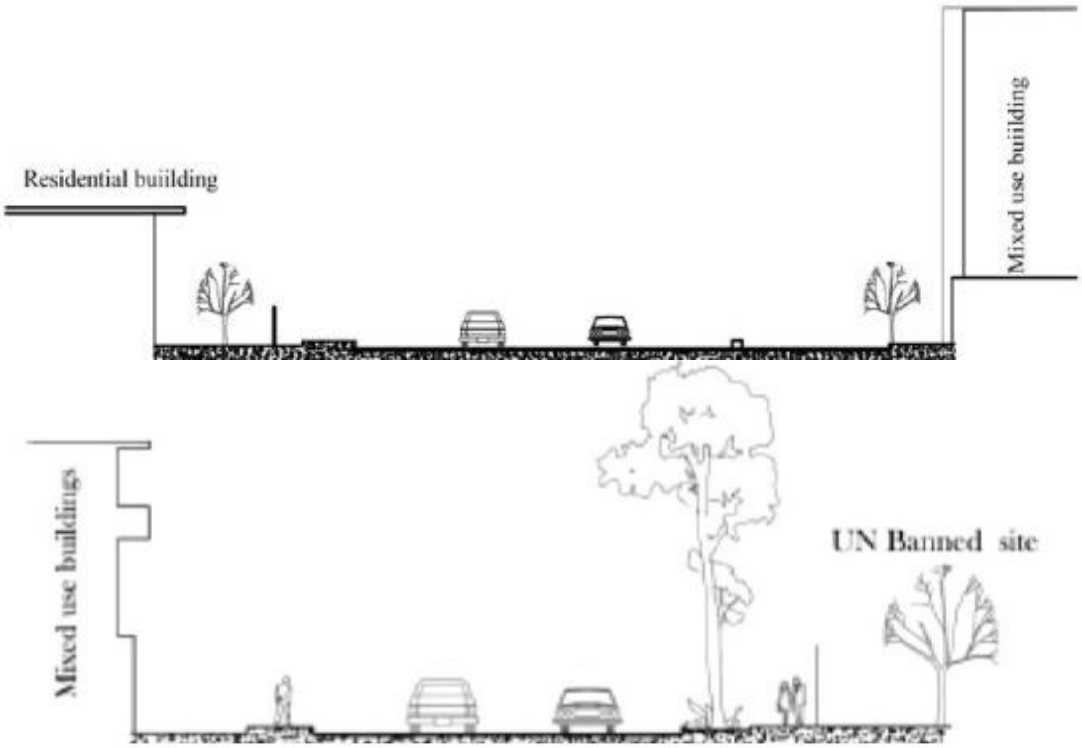


Figure 3.27. Sections from Ismet Inonu Boulevard

Chapter 4

CONCLUSION

In short, this study has been done to analyze street design in respect to social, functional and physical aspects of street and its impacts on legibility in the case of Ismet Inonu Boulevard, Famagusta city. Applying and promoting these characteristics in the case of Salamis Road as the Main Street and boulevard in Famagusta City of TRNC, North Cyprus.

Public open spaces are the main components of urban life. They have an effect on the quality of social dimension of residents' life. Streets as the main constituents of public open space plays an important role in the city. Although not all streets work as public open spaces due to dependency on cars, nonetheless they are major arteries which should not only serve cars but pedestrians and bicycle users as well.

Based on the theme of streets, the research concentrated on the role of legibility as an urban design principle in creating more readable and graspable streets. Within this framework, chapter two focuses on streets as the main component of urban life with a potential to serve the public a space for interaction, entertainment and socialization. Streets can successfully perform their function, if users, either pedestrian, cyclist or car user can easily orient themselves in the area. For this reason, street signs are important as they help improve the easiness of transportation for both vehicles and pedestrians. The accurate use of street signs in streetscapes can improve the legibility

of public open space. Legibility in streets refers to the ease of reading the signs, finding the place and can add to the beauty of public space if designed accordingly.

Streets should be designed based on the social and cultural background of its inhabitants, alongside of standardization of urban design. Buildings' facades, their design, structure, spacing, street signs and etc.have an effect on the legibility of street in the public open space. Legibility serves the needs of pedestrians and vehicles in the streets.

Physical characteristics of streets refer to the form and proportion of buildings, their unity and harmony in the streetscape. The harmony in the physical components of street is important as it helps create legible streets attracting more pedestrians to the area. Streets should be designed to create comfortable and pleasant moments for its users. Street's form is preferred to be curved and narrow due to the sense of enclosure and offer surprising moments as well as continuous views for pedestrians. Streets with the length of more than 15 m loses its scale while having the shorter than this scale is not recommended and preferred. Long streets are used as connectors but the best way is to provide some breaks along the street for increasing the attractiveness and encouraging the pedestrians. Suitable proportion of street width is recommended as 1:1 and 1:2.5 ratios (REF). Buildings' heights and forms should be helping towards creating a harmonious skyline along the street. Ground floor facades of the street shops with various advertisements play an important role in the street edge for passersby and pedestrians.

Although functional and social characteristics are also important issues to be considered, physical characteristics play a significant role in creating a legible street

layout. All aforementioned issues have been thoroughly considered in the case of Ismet Inonu Boulevard in Famagusta.

As an important axis of Famagusta city, Ismet Inonu Boulevard plays an important role in the public life as a public open space. This street has potential of being the main public open space of Famagusta city due to its linking function. This street connect the old and new districts of Famagusta City along with accommodating lots of shops,

Based on the street typology, Ismet Inonu Boulevard is the main boulevard in Famagusta City. Ismet Inonu Boulevard is a one way boulevard with narrow median (1:5 up to 3m). This street contains a safe sidewalk with a tree line which separates the sidewalk from vehicle part. Greenery along this street exist but need to be more structured to increase the beauty, readability and legibility of the boulevard. This street needs a more defined pedestrian realm with continuous three-lined medians, rows of flowers and tree, and fences with greenery spacing, managing a line for sufficient public transport, providing car parks near to the entertainment and shopping centers, possibly a bike lane, discouraging the possibility of mid-walk jaywalking, unique architectural design, and better traffic control. Providing public art and symbols in the important roundabout can also help create a more attractive street and increase the livability of the street, reflecting the culture and value of local population.

Ismet Inonu Boulevard as the most vital and significant street in Famagusta City gained its significance due to the establishment of EMU. Students are the major users of the street. New facilities such as restaurants, new recreational areas, cultural and

youth centre and Lemar retail complex added more attraction motives to the street for absorbing more people to the new district of Famagusta City. Ismet Inonu Boulevard like most of the public open spaces has some positive and negative points.

Lack of continuity in public facilities, lack of sitting spaces, and shortage of semi-open spaces or any other shading elements, poor parking areas, poorly-designed sidewalks, can be recognized as some of the weaknesses of this street. Although it possesses many weaknesses, this street also has a potential to serve for both its local and foreign users if the legibility of the street is increased following the results of this study.

Initially the thesis looked at the physical characteristics of the street in line with literature reviewed and later concentrated on functional characteristics as well as looking into ways of improving social characteristics.

4.1 Physical Characteristics Improvement

Street form:

- Providing continuous street borders to create and increase the sense of enclosure in the street
- Creating suitable proportion along the street (1.0 to 1:5 meter for sidewalk)
- Providing sufficient greenery for making use of wind and shadowing
- Applying boundaries to provide unique and beautiful facades such as greenery and flowering alongside of sidewalks
- filling the blank building facades and vacant areas

Facades form:Defining the standard criteria in terms of color, architectural materials, doorways, windows, size of the block, roof form, texture and etc. along the street;

- Designing shop signs alongside the street;
- Enforcing more striking shop signs
- Renovating the shop front with a regeneration plan
- Improving the design of the street with applying unique materials and design intelligence;
- Screening the vacant areas with special covers or decoration;
- Improving the building facades and quality with structural maintenance;
- Applying harmony between building heights to form a uniform sky line.

Landscapes form:

- Improve the landscaping with the combination of the public art, painting, planting and decoration,
- Increase the space quality through planting
- Highlighting the importance of spaces, building and activities with appropriate lighting

Pedestrian Path:

- Locating sufficient numbers of bins with improved designs and numbers
- Placing sufficient furniture alongside of street to prevent clutter
- Cleaning the sidewalks from any barriers such as boxes, rubbish, advertisement and etc.,
- Differentiating the traffic by suitable flooring
- Using the wind flows to decrease the sidewalk temperature

Legibility:

- Filling the vacant spaces to have continuous edges
- Infilling the building development through improving the quality of urban design
- Improving the nodes quality through lighting and attractive new and modern urban designing for absorbing the attention of more people
- Assigning pedestrian signs to increase the legibility
- Providing breaks along the street with seating facilities and social characteristics
- Activating the EMU and UN edges through better flooring and more lighting, flag and status,
- Defining the appropriate district and entrance for the street.

4.2 Functional Characteristics Improvement

Accessibility**:**

- Increasing the street permeability
- Improving the entrance point sof the street
- Highlighting visual permeability of important buildings
- Increasing the car parking through new multiple flooring parking
- Providing multiple car parking in back side of the street
- Introducing car park signs
- Forbidding the car parking in the sidewalk
- Preventing the high speed along the street
- Providing safe bike lane
- Improving the current public transportation quality and bus stops

- Increasing the number of vehicle for public transportation
- Improving the quality of sidewalks for disabled and elderly people
- Increasing the crossing lanes along the street with appropriate design

Functional aspects:

- Replacing the incompatible functions such as clubs, gas stations and etc. with more active functions
- Filling vacant areas with functional activities like parks
- Placing more cultural functions along the street
- Structuring cultural and social functions near to the roundabouts and university
- Managing the availability of continuous activities du

Social characteristics improvement:

- Providing different activities for different age range such as parks and street theaters,
- Constructing plazas along the street for recreational use,
- Improving children playground and parks near the shopping areas,
- Encouraging social and historical activities in urban environment,
- Offering seasonal, cultural, yearly and artistic exhibition to attract people to the street;
- Controlling the high speed vehicles during night,
- Cleaning the rubbish, wastes, and dumps on a more quicker and continuous pace.

- Improving the environmental comforts through flowering, greenery, planting, shadow and etc.,
- Increasing the pavement quality for better walk

REFERENCES

Alexander, C., Ishikawa, S., & Silverstein, M. (1977). *A pattern language: towns, buildings, construction* (Vol. 2). Oxford University Press.

Batty, M., & Longley, P. A. (1987). Fractal-based description of urban form.*Environment and planning B: Planning and Design, 14*(2), 123-134.

Barnett, J. (1982). *An introduction to urban design* (Vol. 114). HarperCollins.

Burke, J. P., & Ewan, J. (1999). *Sonoran Preserve master plan: an open space plan for the Phoenix Sonoran Desert*. Herberger Center for Design Excellence.

Banister, D. (2012). Assessing the reality—Transport and land use planning to achieve sustainability.

Bell, D. (2005). The emergence of contemporary masterplans: property markets and the value of urban design. *Journal of urban design*, *10*(1), 81-110.

Blanchette, R. A. (2003). Deterioration in historic and archaeological woods from terrestrial sites. *Art, biology, and conservation: biodeterioration of works of art. The Metropolitan Museum of Art, New York, NY*, 328-347.

Buchanan, P. (1988). Facing up to facades: a report from the front. *Architects' Journal*, *188*, 24-7.

Carmona, M., Heath, T., Oc, T., & Tiesdell, S. (2003). Public spaces. Urban spaces. *The Dimension of Urban Design*, *1*, 46-47.

Carmona, M., & Tiesdell, S. (2007). *Urban design reader*. Routledge.

Carmona, M. (2010). *Public places, urban spaces: the dimensions of urban design*. Routledge.

Celik, Z., Favro, D., & Ingersoll, R. (1996). *Streets: critical perspectives on public space*. Univ of California Press.

Carr, S. (1992). *Public space*. Cambridge University Press.

Calthorpe, P. (1993). *The next American metropolis: Ecology, community, and the American dream*. Princeton Architectural Press.

Charter, A. (1931, October). The Athens Charter for the restoration of historic monuments. In *Ist International Congress of Architects and Technicians of Historic Monuments, Athens, October*.

Chiesura, A. (2004). The role of urban parks for the sustainable city.*Landscape and urban planning*, *68*(1), 129-138.

Ching, F. D. (2014). *Architecture: Form, space, and order*. John Wiley & Sons.

Corbusier, L. (1967). *The radiant city: Elements of a doctrine of urbanism to be used as the basis of our machine-age civilization*. Orion Press.

Cullen, G. (1961). *The concise townscape*. Routledge.

Dong, Z. L. (2013, June). Some Reflections on Legibility of the Cityscape. In*Advanced Materials Research* (Vol. 671, pp. 2831-2835).

Das, S., Lee, D., Sillitoe, I., Dawson, N. L., Lees, J. G., & Orengo, C. A. (2015). Functional classification of CATH superfamilies: a domain-based approach for protein function annotation. *Bioinformatics*, *31*(21), 3460-3467.

Druker, J. 2003. Strategy and human resource management. Vol. 41, no. 5. *Emerald Group Publishing Limited.*

Duany, A., Plater-Zyberk, E., & Speck, J. (2000). Suburban nation.

Ewing, R. H., & Bartholomew, K. (2013). *Pedestrian-& Transit-oriented Design*. Urban Land Institute.

Fennell, D. A., & Smale, B. J. (1992). Ecotourism and natural resource protection: implications of an alternative form of tourism for host nations. *Tourism Recreation Research*, *17*(1), 21-32.

Fischer, S., & Fonds monétaire international. (1997). *Capital Account Liberalization and the Role of the IMF*.

Forsyth, A., Hearst, M., Oakes, J. M., & Schmitz, K. H. (2008). Design and destinations: factors influencing walking and total physical activity. *Urban Studies*, *45*(9), 1973-1996.

Fruin, J. J. (1971). *Pedestrian planning and design* (No. 206 pp).

Francis, M. (1988). Changing values for public spaces. *Landscape architecture*, *78*(1), 54-59.

Francis, M. (1989). Control as a dimension of public-space quality. In *Public places and spaces* (pp. 147-172). Springer US.

Gans, H. J. (2002). The sociology of space: a use–centered view. *City & Community*, *1*(4), 329-339.

Gebru, N. (2015). *CREATING WALKABLE ENVIRONMENT FOR AXUM CITY TO ENCOURAGE TOURIST MOBILITY/The case of Axum old Settlement* (Doctoral dissertation, Addis Ababa University).

Gehl, J. (1986). "Soft edges" in residential streets. *Scandinavian Housing and Planning Research*, *3*(2), 89-102.

Gehl, J. (2011). *Life between buildings: using public space*. Island Press.

Gehl, R. W. (2012). Real (Software) Abstractions on the Rise of Facebook and the Fall of MySpace. *Social Text*, *30*(2 111), 99-119.

Gibberd, F. (1955). *Harlow New Town*. Harlow Development Corporation.

Gibbon, D. (1998). Intonation in German. *Intonation systems: A survey of twenty languages*, *78*, 95.

Gottdiener, M. (2010). *The social production of urban space*. University of Texas Press.

Hale, G. E. (1929). The spectrohelioscope and its work, Part I. History, instruments, adjustments, and methods of observation. *Astrophys. J*, *70*(5), 265-327.

Hebbert, M. (2002). Engineering, urbanism and the struggle for street design. *Journal of urban design*, *10*(1), 39-59.

Hayden, D. (1997). *The power of place: Urban landscapes as public history*. MIT press.

Peet, R. (1996). A sign taken for history: Daniel Shays' memorial in Petersham, Massachusetts. *Annals of the Association of American Geographers*, *86*(1), 21-43.

Ibrahim, H., & Cordes, K. A. (1993). *Outdoor recreation*. Brown & Benchmark.

Jacobs, A., & Appleyard, D. (1987). Toward an urban design manifesto.*Journal of the American Planning Association*, *53*(1), 112-120.

Jacob, H. (1995). *Law and politics in the United States*. Longman Publishing Group.

Jacobs, S. E., O'Brien, K., Inwood, S., Kelly, E. N., & Whyte, H. E. (2000). Outcome of infants 23-26 weeks' gestation pre and post surfactant. *Acta Paediatrica*, *89*(8), 959-965.

Kankaya, Y., Sungur, N., Aslan, Ö. Ç., Ozer, K., Ulusoy, M. G., Karatay, M., ... & Koçer, U. (2015). Alternative method for the reconstruction of meningomyelocele defects: VY rotation and advancement flap. *Journal of Neurosurgery: Pediatrics*, *15*(5), 467-474.

Kelly, A., & Kelly, M. (2003). Building legible cities 2. *Bristol: Bristol Cultural Development*.

Boulding, K. E. (1958). *skills of the economist*.

Kim, S. E. (2014). Physical Workplace as a Strategic Asset for Improving Performance in Public Organizations. *Administration & Society*, *46*(5), 496-518.

KLIPPEL A., Winter S.: *Structural Salience of Landmarks for Route Directions*. In: COHN A.G., MARK D.M. (Eds.): Spatial Information Theory. Lecture Notes in Computer Science, 3693. Berlin, 2005.

Kostof, S. (1992). *The city assembled* (p. 46). London.

Kanakiya, R. S., Singh, S. K., & Mehta, P. M. (2015). Urban Canyon Modelling: A Need for the Design of Future Indian Cities. *Atmospheric and Climate Sciences*, *8*, 118-28.

Loukaitou-Sideris, A., & Banerjee, T. (1998). *Urban design downtown: Poetics and politics of form*. Univ of California Press.

Lynch, K. (1960). *The image of the city* (Vol. 11). MIT press.

Lynch, K. (1984). *Good city form*. MIT press.

Lipton, M. (2002). Pills, polls, and professors redux. *The University of Chicago Law Review*, 1037-1065.

LECORBUSIER. (1982). THE'UNITE DHABITATION'AT FIRMINY-VERT, FRANCE, 1967. *A+ U-ARCHITECTURE AND URBANISM*, (143), 11-15.

Lee, K. W. (2014). Feeling like a state: design guidelines and the legibility of 'urban experience'in Singapore. *International Journal of Urban and Regional Research*, *38*(1), 138-154.

Loukaitou-Sideris, A., & Banerjee, T. (1998). *Urban design downtown: Poetics and politics of form*. Univ of California Press.

Long, Y., & Baran, P. K. (2012). Does intelligibility affect place legibility? Understanding the relationship between objective and subjective evaluations of the urban environment. *Environment and Behavior*, *44*(5), 616-640.

Mackett, R. L., Achuthan, K., & Titheridge, H. (2008). AMELIA: making streets more accessible for people with mobility difficulties. *Urban Design International*, *13*(2), 81-89.

MacCormac, R. (1983). Urban reform: MacCormac's manifesto. *Architects Journal*, *15*, 59-77.

Martinez, M. E. (2012). *Urban mechanics: the parking garage as an instrument of legibility* (Doctoral dissertation, Massachusetts Institute of Technology).

Mehta, V. (2013). *The street: a quintessential social public space*. Routledge.

Moudon, A. V. (Ed.) (1987). *Public streets for public use*. New York: Van Nostrand Reinhold.

Mahmoudi, M., Ahmad, F., & Abbasi, B. (2015). Livable streets: *The effects of physical problems on the quality and livability of Kuala Lumpur streets.Cities*, *43*, 104-114.

Murali, V. N., & Coughlan, J. M. (2013, July). Smartphone-based crosswalk detection and localization for visually impaired pedestrians. In *Multimedia and*

Expo Workshops (ICMEW), 2013 IEEE International Conference on (pp. 1-7). IEEE.

Moughtin, C. (2003). *Urban design: Method and techniques*. Routledge.

Marcus, C. C., & Francis, C. (Eds.). (1997). *People places: Design guidelines for urban open space*. John Wiley & Sons.

Madanipour, A. (1999). Why are the design and development of public spaces significant for cities?. *Environment and Planning B*, *26*, 879-892.

Montgomery, J. (1998). Making a city: Urbanity, vitality and urban design.*Journal of Urban Design*, *3*(1), 93-116.

Madanipour, A. (2003). *Public and private spaces of the city*. Routledge.

Norberg-Schulz, C. (1971). *Existence, space & architecture* (p. 17). New York: Praeger.

Önal, Ş., Dağli, U., & Doratli, N. (1999). *The urban problems of Gazimagusa (Famagusta) and proposals for the future. Cities*, *16*(5), 333-351.

Ozbil, A., Peponis, J., & Stone, B. (2011). Understanding the link between street connectivity, land use and pedestrian flows. *Urban Design International*, *16*(2), 125-141.

Punter, J. (Ed.). (2009). *Urban design and the British urban renaissance*. Routledge.

Powazek, D. (2006). *Design for community*. New Riders.

Rapoport, A. (1980). Cross-cultural aspects of environmental design. In*Environment and culture* (pp. 7-46). Springer US.

Raffensperger, C. (1999). Protecting public health and the environment: implementing the precautionary principle. *Island Press*.

Salehi, N., Zabihi, H., & Zarabadi, Z. S. S. (2014*). Evaluation of the Most Influential Criteria of Desirability of High-rise Buildings in Urban Landscape Using ANP*.

Sillitoe, K. K. (1969). *Planning for leisure: An enquiry into the present pattern of participation in outdoor and physical recreation and the frequency and manner of use of public open-spaces among people living in the urban areas of England and Wales* (Vol. 388). HM Stationery Office

Sitte, C. (1945). The Art of Building Cities (trans.). *New York: Reinhold*.

Smith, S. G. (1994). The essential qualities of a home. *Journal of Environmental Psychology*, *14*(1), 31-46.

Sparbert, J., Dietmayer, K., & Streller, D. (2001). Lane detection and street type classification using laser range images. In *Intelligent Transportation Systems, 2001. Proceedings. 2001 IEEE* (pp. 454-459). IEEE.

Shamsuddin, S. (2011). *Townscape Revisited: Unravelling the character of the historic townscape in Malaysia*. Penerbit UTM Press.

Stone, B. D., & Borns, H. W. (1986). Pleistocene glacial and interglacial stratigraphy of New England, Long Island, and adjacent Georges Bank and Gulf of Maine. *Quaternary science reviews*, *5*, 39-52.

Trancik, R. (1986). *Finding lost space: theories of urban design*. John Wiley & Sons.

Varna, G. (2009). Designing the sustainable city: the role of public space.*Universitas, 21*, 187-194.

Tibbalds, F. (1992). *Making People Friendly Towns* (Harlow, Longman).

TOCKER, H. (1969). CANTERBURY DRAINAGE SCHEME PAYS HANDSOMELY. *NEW ZEALAND JOURNAL OF AGRICULTURE*, *119*(6), 70.

Toner, J. P. (2013). *Leisure and ancient Rome*. John Wiley & Sons.

Thompson, B. (2002). What future quantitative social science research could look like: Confidence intervals for effect sizes. *Educational Researcher*,*31*(3), 25-32.

Takami, H., Arai, W., Takemoto, K., Uchiyama, I., & Taniguchi, T. (2015). *Functional Classification of Uncultured "Candidatus Caldiarchaeum subterraneum" Using the Maple System*. *PloS one*, *10*(7), e0132994.

Vuchic, V. R. (2007). *Urban transit systems and technology*. John Wiley & Sons.

Wagner, C. (1954). Contribution to the theory of electropolishing. *Journal of the electrochemical society*, *101*(5), 225-228.

Watson, I., Buchanan, J., Campbell, I., & Briggs, C. (2003). *Fragmented futures: New challenges in working life.*

Weisman, J. (1981). Evaluating architectural legibility way-finding in the built environment. *Environment and behavior*, *13*(2), 189-204.

WEISSENSTEINER E., Winter S.: *Landmarks in the Communication of Route Directions*. In: EGENHOFER M., MILLER H., FREKSA C. (Eds.): Geographic Information Science 2004. Lecture Notes in Computer Science. Vol. 3234. Berlin, 2005.

Wentzlaff, F. (2015). TOURISTS PERFORMING THE UNPREDICTABLE: *THE INFLUENCE OF THE SCRIPT, STAGE AND SOCIAL INTERACTION ON NORTHERN LIGHTS ACTIVITIES IN NORTHERN NORWAY*.

White, M. (1980). Street Life. *Life*, *50*, 120.

Woolley, H. (2003). *Urban open spaces*. Taylor & Francis.

URL1, Accessed (June 24, 2016) from: http://www.pbase.com/dubaidavid/image/58168987/original]

URL2, (Accessed June 24, 2016) from: [http://www.nationalgallery.org.uk/paintings/canaletto-venice-the-grand-canal-with-s.-simeone-piccolo]

URL3, Accessed (July 20, 2016) from: [http://mastersplanning.blogspot.com.tr/2010/11/king-george-boulevard-complete-street.html]

URL4, Accessed (July 20, 2016) from: [http://sfb.nathanpachal.com/2014/02/parking-in-willoughby-update.html]

URL5, Accessed (May 10, 2016) from: [http://www.ite.org/css/online/DWU04.html]

URL6, Accessed (June 17, 2016) from: [http://associationforpublicart.org/public-art-gateway/what-is-public-art/]

URL7, Accessed (June 17, 2016) from: [http://www.visual-arts-cork.com/public-art.htm]

URL8, Accessed (June 20, 2016) from: [http://landscapeonline.com/research/article/11357]

URL9, Accessed (June 19, 2016) from: [https://www.fhwa.dot.gov/publications/publicroads/11marapr/02.cfm]

APPENDICES

Appendix A: Questioner (Sample of English Questionnaire)

Part 1:

1. Gender

Male □ Female □

2. Age

13-18 □ 19-24 □ 25-34 □ 35-50 □ 51-64 □ 65 and older □

3. Marital status

Married□ Single□ Widow□ Divorced□

4. Employment

Working□ University□ Student□ School student□

Retired□ Unemployed□ Housewife□

5. Education

Never attended□ School□ Primary/Secondary School□ High School□

University□ Post-Grad.Degree (Master/PhD) □

Part 2:

1- What is your nationality?

□Turkish Cypriot □Turkish □Other (Please specify) …….

2- Are you a

□Student □Tourist □Local □Resident

3- Are you a shopkeeper or a common user of Salamis Road?

□Shopkeeper □common user

4- Where do you live?

□Walled city □Baykal □Gulseren □Karakol □Sakarya □EMU campus □Other (Please specify)…….

Part 3:

1- How do you rate the safety along the pedestrian paths of Salamis Road?

□Poor □Fair □No idea □Good □Excellent

2- What do you think about lighting of pedestrian paths at nights along the Salamis Road?

□Poor □Fair □No idea □Good □Excellent

3- How do you see the condition of shadings elements along the pedestrian paths of Salamis Road?

□Poor □Fair □No idea □Good □Excellent

4- How do you rate the greenery along the Salamis Road?

□Poor □Fair □No idea □Good □Excellent

5- How do you rate the sitting elements along pedestrian path of Salamis Road?

□Poor □Fair □No idea □Good □Excellent

6- How do you rate the signage along the Salamis Road?

□Poor □Fair □No idea □Good □Excellent

7- How do you see the safety in interaction points between pedestrians and vehicles in Salamis Road?

□Poor □Fair □No idea □Good □Excellent

8- How do you see the safety of pedestrians while crossing the Salamis Road?

□Poor □Fair □No idea □Good □Excellent

9- Do you think the existing entrance points of cars to Salamis Road are adequate?

□Yes □No

10- How do you see the safety and quality of entrance points of cars to Salamis Road?

□Poor □Fair □No idea □Good □Excellent

11- Do you think the existing way of car parking in Salamis Road is safe for pedestrian?

□Yes □No

12- Do you think the side parking along Salamis Road is proper?

□Yes □No

13- How do you rate the density of the traffic along the Salamis Road?

□Low □Intermediate □High □No idea

14- Do you think the number of street signs is adequate enough for passerby and drivers?

□Poor □Fair □No idea □Good □Excellent

15- Do you think the size of signs is suitable enough to understand them from long distances?

□Poor □Fair □No idea □Good □Excellent

16- Do agree with the placement of street signs?

□Poor □Fair □No idea □Good □Excellent

17- How do you rate the physical condition of street signs?

□Poor □Fair □No idea □Good □Excellent

18- Are there enough sign types to increase your awareness of what the street has to offer?

□Poor □Fair □No idea □Good □Excellent

19- Do you think the signs hurt the visual attractiveness of the street?

□Very disagree □disagree □No idea □agree □very agree

Appendix B: Sample of Turkish Questionnaire

İngilizce anket örneği

A: Kişisel Bilgiler

1. Cinsiyet

Erkek Bayan

2. Yaş

13-18 19-24 25-34 35-50 51-64

65 ve üzeri

3. Evlilik Durumu

Evli Bekar Dul Boşanmış

4. İŞ

Çalışıyor Üniversitede Öğrenci Okul Öğrencisi

Emekli İşsiz Ev Hanımı

5. Eğitim

Okula Gitmedi İlk /Orta Okul Lise

Üniveriste Lisans Üstü Derce(Master /Doktora)

1- Uyruğunuz nedir?

□Kıbrıslı Türk □Türk □Öteki (Lütfen Belirleyiniz) …….

2- Siz ?

□Öğrenci □Turist □Yerel □Vatandaş

3- Bir Dükyan sahibi misiniz veya Salamis yolu üzerinde kiracı mısınız?

□Dükyan Sahibi □Kiracı

4- Nerede Yaşıyorsunuz?

□Kale İçi □Baykal □Gülseren □Karakol □Sakarya

□DAÜ Kampüs □Diğeri (Lütfen Belirleyiniz)…….

Sorular:

1- Salamis yolu boyunca yaya yollarınının güvenliğini değerlendiriniz ?

□Zayıf □Adil □Yorum Yok □İyi □Mükemmel

2- Geceleri Salamis yolu üzerindeki yaya yollarının aydınlatması hakkında ne düşünüyorsunuz?

□Zayıf □Adil □Yorum Yok □İyi □Mükemmel

3- Salamis Yolunda yaya yolları boyunca gölgelendirme elemanlarının durumunu naslı buluyorsunuz?

□Zayıf □Adil □Yorum Yok □İyi □Mükemmel

4- Salamis yolu üzerindeki yeşillikleri nasıl değerlendirirsiniz?

□Zayıf □Adil □Yorum Yok □İyi □Mükemmel

5- Salamis Yolu yaya yolu boyunca oturma elemanlarını değerlendirirsiniz?

□ Zayıf □Adil □Yorum Yok □İyi □Mükemmel

6- Salamis yolu boyunca tabellaları nasıl değerlendirirsiniz?

□ Zayıf □Adil □Yorum Yok □İyi □Mükemmel

7- Salamis yolu üzerindeki yaya ve araçlar arasındaki etkileşim noktalarının güvenliğini nasıl buluyorsunuz?

□Zayıf □Adil □Yorum Yok □İyi □Mükemmel

8- Salamis yolunda karşıya geçişler sırasında yayaların güvenliğini nasıl görüyorsunuz ?

□Zayıf □Adil □Yorum Yok □İyi □Mükemmel

9- Salamis yolu üzerindeki mevcut giriş noktalarının yeterli olduğunu düşünüyor musunuz?

□Evet □Hayır

10- Salamis yolundaki güvenlik ve araç giriş noktalarının kalitesini nasıl görüyorsunuz ?

□Zayıf □Adil □Yorum Yok □İyi □Mükemmel

11- Sizce Salamis Yolundaki araçların mevcut park alanlarının yayalar için güvenli olduğunu düşünüyor musunuz?

□Evet □Hayır

12- Sizce Salamis yolu üzerindeki yan park alanlarının doğru olduğunu düşünüyormusunuz?

□Evet □Hayır

13- Salamis Yolu üzerindeki trafik yoğunluğunu nasıl değerlendirirsiniz?

□Zayıf □Orta Seviye □Yüksek □Fikrim yok

14- Sizce sokak işaretlerinin sayısı yoldan geçenler ve sürücüler için yeterli midir?

□Zayıf □Adil □Fikrim yok □İyi □Mikemmel

15- Sizce sokak işaretlerinin boyutu uzun mesafeden onları anlamak için yeteri kadar uygun mudur?

□Zayıf □Adil □Fikrim yok □İyi □Mikemmel

16- Sokak işaretleri yerleştirmelerine katılıyor musunuz?

□Zayıf □Adil □Fikrim yok □İyi □Mikemmel

17-Sokak işaretlerinin fiziksel durumunu nasıl değerlendirirsiniz?

□Zayıf □Adil □Fikrim yok □İyi □Mikemmel

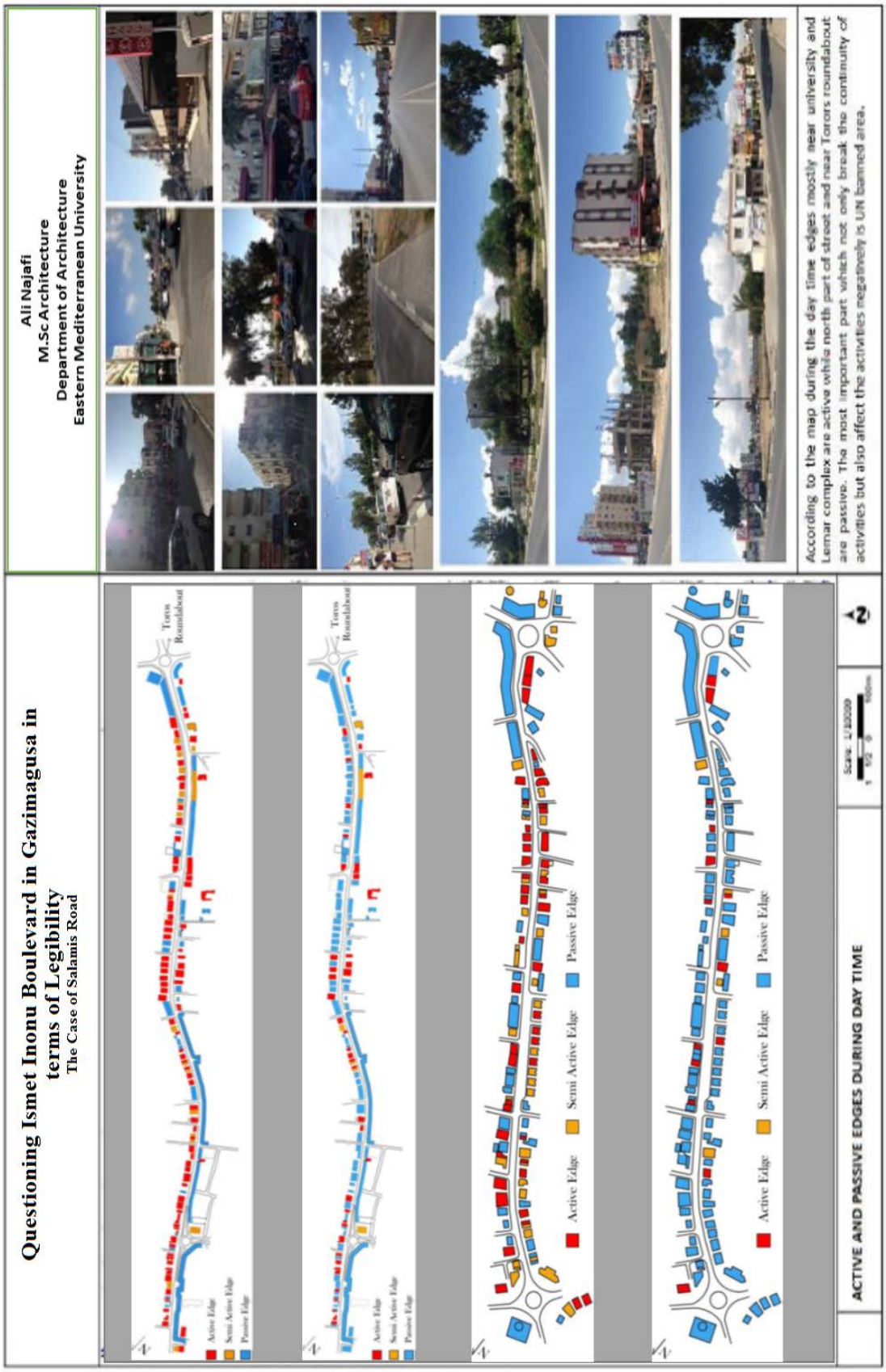
18-Sokakta size neler sunulabileceği bilincini artırmak için yeterli işaret türleri var mıdır?

□Zayıf □Adil □Fikrim yok □İyi □Mikemmel

19- Sizce işaretler caddenin görsel çekiciliğini zarar veriyor mu?

□Kesinlikle Katılmıyorum □Katılmıyorum □Fikrim yok □Katılıyorum □Tamamen katılıyorum

Appendix C: Analyses Maps



P1: active and passive edge

P2: Lynch Analysis