De-Fragmentation of space within Dwellings and Neighbourhoods in Al-Madinah

Using Urban Information Systems
(Space syntax & Arc/ GIS)

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Abstract

This research addresses one of the major cumulative problems in Saudi Cities; the fragmented developments of urban lands. Such fragmentation is caused by wasteful standards and measures that are used during subdivision of land, and building control codes for residential units within plans after they are approved. Moreover, it is because of lack of application of urban information systems in neighbourhood planning. The main goal of this study is to draw up a guidance policy that de-fragments wasteful spaces and consequently reduces costs of both dwellings and neighbourhoods by adjusting consumption of space in regard to the socio-economic characteristics of the majority of the residents.

The case study is Al-Madinah owing to it had unique form of traditional houses, and neighbourhoods known as ‘Ahwash’. They are the two main categories of units that form the city as a whole.

At the end, the study draws a guidance technique as a recommendation for future planners to use Urban Information Systems as tools to study Neighbourhood Planning to de-fragment space within dwellings and neighbourhoods, and re-adjust building regulations with regard to their socio-economic characteristics and the local culture of Al-Madinah.

The final results and proposals are a major contribution for the majority of residents who are still tenants to enable them to buy a plot and build on it, and the municipality can reduce the costs of their services among fragmented urban areas to upgrade their facilities within neighbourhoods, infrastructure agencies can reduce the cost of networks and improve the quality of their services and reduce the cost of service for public, and developers can understand the actual demands for housing not only for their own revenue by providing only luxury measures in dwellings but also to provide affordable dwellings that can be owned by residents with lower socio-economic characteristics.
Dedication:

This thesis is dedicated to my father: Mr. A. NEYAZI, (Died 2003 during my data analysis, and was buried in Al-Madinah) who gave me an opportunity to live in Al-Madinah, its traditional neighbourhoods and houses, farms, mountains and to love places and spaces within
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Lastly great thanks to all of Al-Madinah’s residents, decision makers, real estate agents, landlords, brokers, and the public who were asked questions and responded with open mind, ears and the generous data they provided to enrich this research with empirical views, claims, ideas, and sometimes prayers to succeed to get the best guidance for the future of Al-Madinah and its residents

For all of the above thanks so much your help was very valuable and appreciated

Yours

Yousef A. Neyazi

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Chapter One: Research Introduction

The structure of life I have described in buildings - the structure which I believe to be objective - is deeply and inextricably connected with the human person, and with the innermost nature of human feeling. (Christopher Alexander)
1.1 Background

During the last three decades, cities in Saudi Arabia have witnessed a huge improvement in standard of living and wide growth in services and their distribution. The Saudi Ministry of Planning issues five yearly plans to cover all aspects of developments for cities. The Seventh Development Plan, a chapter for development of urban and village territories includes nine issues which are strongly related to neighbourhood planning (Ministry of Planning 1998: 5). Social and economic development is common among the series of five yearly development plans in spreading urban patterns across all parts of Saudi Arabia (Eben-Saleh 1997), but huge increases in both population size and urban expansion have resulted in high demands and high costs of managing those demands. The research focuses on three of those issues that cause fragmentation of urban areas with vacant lands left between. But the general issues are as follows:

1.1.1 Demand for municipal services and utilities within Al-Madinah

Because of the increase in population, especially in urban centres, demand for municipal services and utilities has increased. Al-Madinah is one of the main cities in Saudi Arabia, which faces this high demand owing to its high rates of increase of both population and urban areas. Thus, it is stated:

'All districts should be unified in terms of building regulations and essential services before distribution of plots. Municipalities should provide the services, and if not, plots then should not be allowed for sale' (Al-Jehani 2002)

1.1.2 Expansion of cities and their urban boundary:

Urban extension and overpopulation in big Saudi cities causes a shortage of vacant land within cities, which leads to the spread of residential neighbourhoods far away from the city centre and each other. This increases the difficulties of covering the high demand for municipal services and utilities. Nevertheless, existing road networks will face difficulties in connecting all the different parts. Consequently there are increases in costs for building, and operating and maintenance. This is because the urban boundary policy was not continually applied and conditioned with actual need of the process of expansion. But it seems that most cities in Saudi in general, and Al-Madinah in particular, are increasing in their urban boundaries with fragmented developments which waste lands by using policies and regulations which were designed
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to control neighbourhood development. This is inappropriate because detailed research should be conducted at both neighbourhood level and then even more detailed studies should be carried out into the micro scale of the dwelling unit in order to revise such policies and regulation, and then adjust them to local characteristics and the actual needs of residents.

1.1.3 Neighbourhood planning as interest area of Study

The research focus is on present policies of neighbourhood planning in Al-Madinah. Most employees such as planners, architects, and general managers of urban planning in Al-Madinah municipality, indeed do not care about how the design of neighbourhood plans affect costs for households, local government and infrastructure agencies. On other hand, Al-Madinah had the most beautiful traditional neighbourhoods, which were called *Ahwash* (plural of single *Hoash*). They were like copies of the Prophet neighbourhood, which is a model of the real neighbourhood in Islamic history. But sadly, during the last extension of the Prophet's Mosque in 1986 and the surrounding area, the entire old city was demolished completely. This occurred because planning was left to the judgment of interested parties without considerations of culture and the public and their human rights.

Then, the research, from this point of view, explores the problem of fragmentation of the urban developments and spaces not only in the city of Al-Madinah but looks in depth at neighbourhoods, and more within the dwelling unit. Fragmentation is assumed to be caused by the process of neighbourhood planning systems in Saudi Arabia, where it goes downwards centrally from the capital city ‘Ar-Riyadh\(^1\), then to other cities' municipalities, and then to minor village clusters (local authorities). But, Potter and Lloyd (1998) argued for the recent philosophy of *bottom up* planning and development emphasis that changing society should focus on the lower classes of the settlements then pass to upper hierarchies of decision makers. Concentration should not be on one point but more, on many new localities (*Potter and Lloyd-Evans 1998: 47-50*).

Thus, most decisions, regulations, standards, norms and measures fit only the decision-maker’s socioeconomic conditions, and are inappropriate for most of the public’s conditions. Fisher (1991) states that the most successful cities are those with local building policies that arise from their actual needs and demands, in other words

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\(^1\) Ar-Riyadh is the official name instead of Riyadh as it used to be.
necessity and economics (Owen 1991). After the voting for municipal councils in Nov 2003, the BBC announced:

‘In November, King Fahad granted wider powers to the country’s consultative council, the Shura, and announced that the first ever elections - for local councils - would be held next year.’ (http://news.bbc.co.uk/1/hi/world/middle_east/3344655.stm 2001-2002)

At last, research might give some guidance on how decision making for neighbourhood planning should be in Al-Madinah with consideration of the bottom-up model of processes and procedures.

1.1.4 High cost of housing projects

One of the consequences of current neighbourhood planning procedures and their building codes and regulations is the high cost. It might be due to; firstly, the high cost of the individual plots according to their physical characteristics such as sizes, shapes, building materials and layout of the whole plan. Secondly, low funds and subsidies for housing projects according to the wealth of the country. This should not be the case in oil producer countries such as Saudi Arabia. Thirdly the cost could be for technical reasons, where layout of plans may be left to the actors' points of view and interests and the data and information they have. Struyk (1988) states:

‘First, it is more difficult to reduce total housing needs than the level of housing investment, as measured in the number of units of acceptable quality. Second, there is no question that, in the long run, reducing population growth is a key element in reducing housing investment requirements and the subsidies that would be necessary if a government committed itself to meet all of its country’s housing needs. Third, reduction in the required subsidies is highly responsive to three changes: lowering design standards for minimally acceptable units, reducing mortgage interest rates, through macroeconomic policy, and increasing the share of income devoted to housing by those who would receive the subsidies.’

Finally is the administrative methodology. Computer technology is widely applied in urban planning, even in developing countries. But, it has neither been applied in cooperative form between the related agencies and bodies nor -where it has been adopted-

used as a tool for data analysis in a single administration as it should be, especially in the early stages of the process of neighbourhood planning.

1.1.5 Urban Areas and sizes of plots

Al-Al-Madinah was the first capital of the Islamic Nation since Prophet Mohammed established his nation there fourteen centuries ago. Nowadays, it is one of the major cities in Saudi Arabia for its religious importance, and where most of the development policies are concentrated. Al-Al-Madinah has plenty of land which was planned (subdivided), but not developed or partially developed. It also has large informal areas of random houses. Both kinds of urban areas require development and infrastructure networks and services. They differ in plot layouts and sizes and their measures of residential units within plots. The research here examines both types of urban land (planned and informal), socio-economic relations with regard to the size of the residential unit, and relates them with the satisfaction of residents. Then it sums up guidance for mean size of residential units regarding sizes of rooms, size of plot regarding type of housing unit needed, courtyards, and shapes of plot within neighbourhood plans to increase density.

1.1.6 Costs of infrastructure networks

Land-use is the core of the urban planning process. One of the main uses is residential-use or housing. This use is strongly related to other land uses. The plot layout is one of the important factors affecting the cost of infrastructure networks. While networks of roads, wires and ducts are essential for the movement of people, goods, facilities and information, it is well known that the major task of urban planning among the industrial countries is the provision of infrastructure networks. Thus, local governments are always investing in the capacity of these networks and also seeking effective methods of production, distribution and consumption.

In these developed countries it may spread even into the urban fabrics so that urban management is needed to control urban expansion. In the less developed countries these networks may be just in the major cities and moreover in particular districts of such cities, where other areas lack these networks even if the land- subdivisions (plot plans) are officially approved. Departments of urban planning and related bodies in these cities are hardly used to deal with these high demands and pressures, but funds

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and capabilities are limited. Thus, this study is an important issue for saving money and solving the problem in the early stages of the planning process.

1.1.7 Data and Municipal Statistics Information:

Despite the progress gained in the municipal sector in data collection and handling during previous plans, there is no integrated data and information about the capacity of urban land, services and utilities. Moreover, there is no updated data about numbers of stakeholders and ratios of coverage areas. Furthermore, many administrations in the Ministry of Municipal and Village Affairs operate data collection and analysis in various ways and methodologies but do not follow them up with an integrated and comprehensive database. Therefore, they have obvious difficulties in allocating accurate needs in term of their built environment. Thus, it is essential to obtain a comprehensive Urban Information System (UIS) connecting the Ministry, its administrations, related agencies and institutes. UIS should have the same scales, measures, standards, norms and models in data collection, entry, data manipulation, and presentation, but each city or village should have different characteristics.

1.1.8 Urban Planning and Applications of UIS as a tool

In neighbourhood planning, all decisions are combined. In most current subdivision plans, it is not enough for planners to be concerned only about designing an individual building within a city or creating a good city. Clever planners should seek to coordinate the many actors who shape the urban structures of society to avoid unwanted side-effects, and to achieve some good for the community. Thus, planning became more complicated in terms of inter-relations between population, location, socio-economic data, and various organisations and bodies who share such data (Campus.ESRI.com, 27 June 2000). Therefore, it is essential that Geographic Information Systems (GIS) should be shared when updating information and not separated for each sector's own interest. These systems for urban planning are called Urban Information Systems (UIS). Thus, in the developed countries they are essential tools for the science, methods and utilities of infrastructure planning. A clearer understanding of constraints, alternatives and consequences associated with the problem may be obtained by using UIS. They provide a sound conceptual model for framing planning problems.


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The merits of UIS are the efficient management of data flow, especially in the urban networks dealing with planning matters, and the improvement of the quality of services. The major merits are production and distribution of information. However, more research is needed to benefit from these new systems and their services as Laterasse and Deutsch stated (Laterasse and Deutsch, 1991).

Martines (2000) evaluates housing needs with the use of GIS in a study area in Rosacia's six new districts. This application of GIS is used by the municipality in evaluating housing needs and conditions using digital and census data in spatial analysis and the allocation of housing conditions and access to services and amenities. (Martines, Javier Alberto, Habitat International 24/2000, pp.; 501-515)

1.2 Research Contributions

Research has multiple contributions. Firstly, it adds a major point of 'Islamic Neotraditional Planning' to the field of urban planning generally in Islamic and Saudi cities and particularly in Al-Madinah. Then, it explains through its chapters in a systematic order how the problem of buildings has changed through the transformation process. Then, it draws up a rational methodology of how building regulations economically affect government in terms of cost of infrastructure networks and socially, the effects on the public as a community neighbouring unit. Finally it predicts various scenarios of different categories of quantity and quality of dwelling units, and as a base for building regulations for future neighbourhoods and how that affects the whole city in size and costs. The significance here is the use of as many information technologies as the researcher can handle, as tools for planners which are hereafter called Urban Information Systems. Moreover, the use of notion defragmentation is unique in the field of urban planning and reflects the philosophical approach and scope of the study.
1.3 Research Scope and de-fragmentation

The research addresses one of the major problems in Saudi’s cities. The study refers to Madinah or Al-Madinah. The assumed problem is the fragmented development and vacant land between, which are mainly caused by wasteful standards and measures of residential units and controlled by building regulations in neighbourhood plans.

The approach of defragmentation was drawn up when the author read the city of Al-Madinah and found fragmentation among its urban forms. These patterns are as follows: planned districts; informal districts; farms and vacant land. The similarity between the city and computer hard disk is seen by the author in term of space. Author read fragmentation of urban developments and spaces as same as files in the hard disk of computer.

In the computer, fragmentation occurs when the operating system can not find enough connected space to set and save a complete file as a unit. Yet, it saves them as parts segregated by gaps and other different electronic file parts. Consequently, the size and space is inflated by fragmented parts and wasted spaces between and because of this operating systems will lose performance, especially in speed. This is because time is wasted when the system moves between fragmented files and collected to be shown as one coherent file. Therefore efforts will be fragmented (Wikipedia The Free Encyclopedia 2004). This notion is well known in the Internet and information technology but very rare in the field of urban planning. Another clear explanation of defragmentation is as shown in Figure 1.1, where sometimes it can be called optimizer.
fragmentation

(1) Refers to the condition of a disk in which files are divided into pieces scattered around the disk. Fragmentation occurs naturally when you use a disk frequently, creating, deleting, and modifying files. At some point, the operating system needs to store parts of a file in noncontiguous clusters. This is entirely invisible to users, but it can slow down the speed at which data is accessed because the disk drive must search through different parts of the disk to put together a single file.

In DOS 6.0 and later systems, you can defragment a disk with the DEFRAg command. You can also buy software utilities, called disk optimizers or defragmenters, that defragment a disk.

(2) Fragmentation can also refer to RAM that has small, unused holes scattered throughout it. This is called external fragmentation. With modern operating systems that use a paging scheme, a more common type of RAM fragmentation is internal fragmentation. This occurs when memory is allocated in frames and the frame size is larger than the amount of memory requested.

Figure 1.1: What does fragmentation mean, and how does it occur?

On the other hand, fragmentation in a city occurs when urban development is allocated in undirected role: growth of informal areas; or approved as neighbourhood plans, but find difficulties on provision of services to such developments because of unmovable land; erosion of farms; demolition of old buildings; and vacant lands, which are segregated the new proposed developments far from current infrastructure networks. This similarly will cause fragments of urban forms between all patterns and consequently slow development, loss of performance, and more cost for infrastructure networks.
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Similarities between the hard disk of a computer and the city of Al-Madinah are regarded in these terms:

- Virtual memory space; similar to urban space
- Contiguous folder and file; similar to neighbourhood unit, and dwelling unit
- Fragmented files; similar to informal areas and wasteful dwellings
- Unmovable files; similar to valleys, mountains, and holy zone
- Free space; similar to vacant lands
- Capacity of memory space; similar to population capacity of the city
- Memory basic unit byte; similar to a basic urban unit in a house (‘Bait’ in Arabic)
- Virtual space of computer and spiritual theme of Al-Madinah as a holy city
- Defragmented files are similar to neotraditional dwellings and neotraditional neighbourhoods after adjustments of measurements.

Yet, these issues allow this approach to be formed in the mind and then to be adopted as an urban problem specific to Al-Madinah and Saudi cities in general. Defragmentation then is the process which compacts or optimizes the size of primary units that form the dwellings, neighbourhoods, and the entire city.

The defragmentation model evaluates contemporary neighbourhoods as attached but subdivided plots, detached dwellings but segregated neighbours and fragmented developments. Moreover, informal districts which are mostly within the holy zone are also fragmented, as are the areas around mountains and valleys. Farm lands are also fragmented because of speculation for fast return of revenues by urban sub-division, rather than from agriculture.

Regarding the model in chapter five for traditional neighbourhoods and relationships between courtyards and number of dwellings around them, it has been associated with the relationship between area of courtyards 'Hoash' and the total area of dwellings around them with assumption for mean area of traditional dwellings, also called 'Neotraditional Houses'. Neotraditional house is the house that similar to traditional house in space configuration, but fit contemporary socio-economic characteristics of dwellers. The model is set up with flexible measures to make it applicable in any of the following: vacant un-subdivided urban lands, subdivided undeveloped blocks, informal obsolescent blocks, or neighbourhood plans in the process of approval. The model is
constructed with regard to the traditional Islamic first block of Prophet Mohammed that he built when he first arrived in Al-Madinah fourteen centuries ago as stated in chapter five. Moreover, it is understood that 'Ahwash' the plural of 'Hoash', were the traditional form of neighbourhoods in Al-Madinah until all the old city was demolished for new development of the central zone around the Prophet's Mosque, which is one of the most holy mosques in Islamic countries. Yet all pilgrims who do hajj to Makkah visit this mosque. More than three million visitors come annually to pray at this mosque. Consequently, the extension of the mosque and upgrading of the surrounding areas with new hotels and business properties required the decision to destroy the entire old city but all of the traditional neighbourhoods or 'Ahwash' are sadly missed. All those neighbours who were living in such neighbourhoods and houses have been fragmented into the informal areas or new subdivided plans.

Moreover the fragmented detached dwellings are separated by set-back from all sides with a minimum of 2m from each. This primary theory that comes before the research is called 'de-fragmentation'. The research is to examine if the de-fragmentation will lead to the use of wasteful set-back regulations and save cost of land and infrastructure networks. Nevertheless, it includes consolidation of a shared open space between dwellings instead of single courtyards. The case study in this theory is that the society of Al-Madinah had a unique form of neighbourhood that were called Ahwash. Dynamics exist in social relations in terms of content and context. This requires and guides the researcher to think, understand, explain, analyse, find out and observe general statements within a framework of his own interest and to be shared by others in the case study area. May states:

"In the process of research, we embark on empirical work and collect data which initiates, refutes or organizes our theories and then enables us to understand or explain our observations."

(May 1996)

But to be positive, the researcher avoids staying within the topic in the data collection and investigation and analysis stages. Data, figures and results are drawn up to show findings of the relationships between regulations of neighbourhood planning, its effects on the cost of the residential units and their infrastructure networks. Moreover, they show gaps between needs and provision of policies. At the same time, ArcView/ GIS is a software tool used in Urban Information Systems, which planners can use for
Neighbourhood Planning. It has made a big contribution for residents, municipalities, housing and transportation departments, infrastructure agencies and organisations in terms of reducing costs in all data-based processes of neighbourhood planning, creating more accurate standards and norms for the building environment and application of UIS as a tool for modelling in this matter of interest. Nevertheless, it is raised now because of the new movement of E-Government as a new form of governing and business. A planner using E-Government can use Urban Information Systems for evaluation of neighbourhood plans at the early stages in terms of social-economic efficiency. Huge savings can be made in future planning and vast differences made in the case of treatment of current plans.

This research is concerned with the effects of units on the whole upward process of neighbourhood planning. It starts de-fragmentation by taking parts of the city as neighbourhoods, and then the neighbourhood to its main cellular parts, which are the dwellings. The importance here is in forming future guidance for measures, standards and norms of neighbourhood planning regarding the effects on cost considerations for individual households, governmental bodies, and infrastructure agencies. Moreover, it draws up guidance for dwelling units regarding quality and quantity terms based on residents' satisfaction levels. Nevertheless, it is guidance for both architects as a methodology of design rather than selling copies of a single model, and for developers to understand the exact demands for dwellings that they should provide for the market those are satisfactory in both, quantity and quality. The research here examines both types of urban land (planned and informal), socio-economic relations with size of the residential unit, and relates them to the satisfaction of residents. The unit of the plot and the dwelling unit are both used: their types are recorded as qualities, and their sizes as quantities. The whole is Al-Madinah city in Saudi Arabia with its all neighbourhoods.

1.4 Research objectives

The research started with the general aim of examining neighbourhood planning to evaluate how far existing neighbourhoods and households satisfy low cost infrastructure networks. It was later refined to the following objectives:

- The key objective is to examine contemporary urban planning policy for neighbourhood and building regulations in Al-Madinah, with the assumption that their space consumption is wasteful. This requires evaluating current land subdivision to
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plots and the forms that are most common in Saudi Arabia, and in particular in Al-
Madinah, and whether they meet residents satisfaction or not.

- The second objective is to explore the traditional built environment in Al-Madinah, based on the main resources of Islamic Law. It aims to show how unique the form of neighbourhood in Al-Madinah is in comparison to other Islamic cities.

- The third objective is to examine resident's socio-economic characteristics; and whether current dwellings that are considered to be different to traditional houses fit with actual needs in terms of the size of dwellings, types, and neighbourhood form and amenities within.

- The fourth objective is to adjust such measures to fit with actual demands of dwellings and amenities within neighbourhoods and how such adjustments affect the cost in each different scenario of urban patterns; either planned, vacant, or informal lands.

- The last objective is to increase understanding of the use of new technology (GIS) as an essential tool for urban planners during the process of Neighbourhood Planning, and how it can be used for analysis to frame the urban policy by measuring such standards. The research will then look at how these technologies can be used in the process of evaluating neighbourhood plans in the early stages by testing such measures within the primary proposal of the plan.

The process of readjustment of building regulations and examining them starting from rooms within dwellings, dwellings within neighbourhoods, and neighbourhoods within Al-Madinah is an approach called 'Defragmentation', instead of consolidation of urban dispersed developments. This approach clarifies the process of readjustment of wasteful measures and building regulations that are currently applied to Saudi Arabian neighbourhoods within planning policy. The research shows how these building regulations can be adjusted (optimized) to set the minimum satisfied measurements of space within dwellings to form neo-traditional dwellings without wasteful spaces, and which meet the preferred quality. In other words, how can wasteful spaces be defragmented to make compact ones? Thereafter, the study will examine how this can work on a larger scale in the neighbourhood, and the entire city of Al-Madinah and its urban patterns. The research will then summarize the benefits that can be gained from this defragmentation as an alternative policy to current subdivision policy and building regulations. The key benefit is an estimation of the
total saving of costs of construction of individual housing units and infrastructure networks as a result of reducing plot sizes and building regulations in neo-traditional dwellings and neighbourhood proposals.

The objectives above comprise this study, with detailed articles based on empirical field survey of data. In order to reach these objectives research questions are necessary to undercover issues relating to neighbourhood planning and the case study of Al-Madinah.

1.5 Research questions

The main research question concerns the current neighbourhood planning policy in Al-Madinah and whether building regulations are wasteful or not. Meanwhile, more investigations are required for a PhD research in three areas; social, economic, and physical “urban”. The social dimension deal with the residents of Al-Madinah and their demographic characteristics. The economic concerns residents’ income, their capabilities to own the dwelling units they live in and Governmental and bank funding for assessment of ownership. The urban dimension is about the dwellings, neighbourhoods, and the city.

The second question is an investigation of how, if current building regulations are wasteful, this causes urban fragmentation in Al-Madinah.

This requires a review of the principles of urban planning in Saudi Arabia within Muslim countries and in the developed world. Moreover, the research is a query about urban policy and strategic principles in development plans in Saudi Arabia between theory and practice in term of building regulations. This query is to evaluate the resulting contemporary built environment and its’ processes of transformation from traditional ones, and to the satisfaction of residents in contemporary ones within the three areas mentioned above.

The third question is how can wasteful spaces within dwellings and neighbourhoods be readjusted to fit with the actual needs of households and neighbourhoods? This question requires an exploration of dwelling unit’s types, sizes and various patterns of neighbourhoods in Al-Madinah and how satisfaction levels vary among them. Such an investigation and exploration of the figures, diagrams, and tables show how urban policy and building regulations influence whether or not residents are satisfied with services and amenities provided.

Readjustment also raises the question of minimum satisfaction levels of residents in terms of quantity of space within dwelling units. Moreover, another issue concerns
which is the most preferred household type in Al-Madinah, apartment, house or villa. Such questions will determine the optimum size and type of dwelling that is generally preferred and fit the socio-economic characteristics of the majority of Al-Madinah households. The resulting dwelling unit with regard to both type and size is consequently considered a first process of defragmentation, followed by the optimum size and morphology of neighbourhood based on Islamic principles in terms of neighbouring as a cultural issue and as urban ones in terms of shape and size.

The fourth question is what the benefits of defragmentation are, and how it can be applied. This requires examination of the proposals for dwelling units within proposed neighbourhoods in three patterns in planned, vacant, and informal lands. This process can be a model for examining any proposed neighbourhood plans and can determine whether defragmentation with adjusted measures is better than the proposed in terms of cost of infrastructure network, space consumption, and social benefits of neighbouring by the form of neighbourhood plan and pattern of subdivision.

The last question concerns the main findings and conclusions from the research to aid future knowledge of neighbourhood planning in Islamic city and what lessons can be learned from the case of Al-Madinah, and the use of defragmentation process and the tools of urban information systems.

This will not only provide guidance for planners, architects and urban designers in Al-Madinah but also to others in other Islamic cities for future neighbourhood planning. Others in non Islamic countries may benefit from the methodology and the proposals as concepts but this should not be seen as one model which will fit any city. These research questions underpin the structure of the thesis.

1.6 Research Structure:

Based on the above objectives and their questions, the whole research has been structured as each objective in one chapter. But mainly they are in three sections. The study is divided into three main parts, as follows:

- **The introductory section** is about the research, literature, Al-Madinah as a study area, and research methodology. *Chapter one* is a general introduction about the significance of the research and nature and relationships between neighbourhood planning and urban information systems (UIS) as a tool for analysis. Then it shows research scopes and objectives, questions, structure and methodology, and finally
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limitations. Chapter two is a general literature review about neighbourhood planning and its progress through history in developed countries, and Saudi in general and in Al-Madinah specifically. Chapter three is a brief background about Al-Madinah as the study area. It shows on the one hand its importance as a capital of its region in the spreading of informal urban areas around the old city and near mountains, which are occupied by desert-people who have migrated there from surrounding areas. On the other hand, it shows how Al-Madinah as the first Islamic city and where the Prophet Tomb is, to the Muslim world affects its planning and complete demolition of the old traditional city and how that caused the spread of its urban cordon and passed over for new residential districts, which increase the difficulties of costs to pass over into infrastructure networks. In short, it shows Al-Madinah's present urban context and how far this situation is removed from the Development Plan's recommendations. Chapter four is about the research approach and methodology. It describes the data dealt with by the research both quantitatively and qualitatively and linkages between them. It explores data needed by the researcher and how he determined the data and took an empirical field survey of Al-Madinah to collect data. Moreover, data analysis was carried out by using SPSS for questionnaires, Space syntax for dwelling designs and maps were analyzed by ArcView, ArcCatalog, and ArcGIS. In short, this chapter explores the nature of the problem and outlines the structure of the research and how and why it is in that form.

- The body section includes four chapters. Chapter five explores and analyses the compact integrated traditional neighbourhoods and how they have been transformed and fragmented into new development. It evaluates the new transformed neighbourhoods and how they can be re-designed like traditional ones in terms of the concept of neighbourhood and open space between. It proposes a model for traditional neighbourhoods and the relation between areas of open space and the number of the surrounding dwellings. Chapter six analyses residents' satisfaction regarding fragmented contemporary neighbourhoods and amenities by using SPSS. It concludes both positive and negative satisfactions and interrelationships between factors and variables that affect satisfaction levels with regard to a neighbourhood's amenities. Chapter seven goes deeper inside the quality of dwelling and evaluates designs of dwellings and compares them with traditional ones using space syntax gamma diagrams for various types of dwellings and satisfaction of residents and how neighbourhood policy and regulations change the type of dwellings from integrated spaces to

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Chapter eight evaluates the quantity of dwelling units regarding sizes of each space (rooms) within and then the whole dwelling unit with satisfaction level to actual measures. Then it explores how small fragmented spaces can incur huge costs in construction within dwelling types.

- The end part consists of two chapters. Chapter nine sums up all the results, findings and conclusions from previous chapters and puts the main assumptions for de-fragmentation of urban space in the neo-traditional neighbourhood model based upon neo-traditional dwellings. Then it examines the proposed methodology of modelling in contemporary urban land and through various urban form patterns (planned, informal and vacant). Empirical GIS analysis was done here to test the model and to propose a methodology for evaluation of new neighbourhood plans in terms of quality and quantity. Chapter ten is for the final conclusions resulting from analysis of individual residential units, neighbourhoods and the whole city of Al-Madinah before and after de-fragmentation. Then it gives recommendations for applications of the research and the proposed model, and for future research using Arc/GIS by measuring street lengths and areas as tools for evaluation of new neighbourhood plans.

1.7 Research Limitations

This research is limited in terms that the author is human and might make mistakes. The case study has been limited only to Al-Madinah city and its neighbourhoods and houses. Application of any proposal in this regard will not be totally correct and applicable for other cities either in Saudi or in any other country. In case of application, then each case study should have its own entries of socio-economic and cultural characteristics. Other limitations can be listed as the author can see as follows:

1 The questionnaire sample size is quite small because of the use of interviews, samples from digital maps, samples from design permits and because of difficulties of resonance in Saudi for such studies, and because of Saudi culture in terms of time and privacy, which were detailed in the research methodology.

2 Urban information systems such as GIS, Space Syntax, and SPSS are not professionally applied, as the author learned on arrival in this country, because of unfamiliarity with such systems, other than those trained and self learned via virtual training centres such ESRI, or by those who use software for tutorials? Moreover the main supervisor is the same. These systems are only used as tools

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for analysis for specific tasks but not as purely technical science. That research consumed a long time.

3 The author's skills in English reading and writing are not the same as a native and translating from Arabic quotations or comments in interviews and questionnaires may sometimes have some weaknesses.

4 Finally all maps were dealt with as colour ones if needed, otherwise the rest are left as black and white as this is easy for copying, and landscape page setup is used for clearer images sometimes.
Chapter Two: Literature Review

“Adequate information about the existing environment and about the types of place that it is desirable to make cannot be kept inside one brain.” Christopher Alexander

“We shape our buildings; thereafter they shape us.”
Winston Churchill
2.1. Introduction

Over the past thirty years, most Saudi cities and villages have lost their urban architectural identities because of rapid modern development and development processes. This is due to the discontinuity of local urban patterns and architectural realities for the traditional built environment (Eben Saleh, 1998). This diversion led to many changes, not only in culture and society, but also in their activities and environmental measures. Changes occurred in building codes of neighbourhood planning a consequential cycle starting with houses and their plots, to clusters, to neighbourhoods, districts, and then to towns and cities.

This research does not follow Sir Ebenezer Howard's recommendation to leave actual cities and develop completely new towns, but to deal with these cities by reviewing the policies behind the current urban problems that they face. The core of this research is to explore fragmentation of urban developments in the holy city of 'Al-Madinah'. Such urban fragmented developments are caused by neighbourhood planning systems in Saudi Arabia and its regulations in terms of building codes in both houses within plots, and plots, services and neighbourhood layouts, which may increase both individual home costs, and costs of the infrastructure network. Thus, Boyer states that:

'The urban research and analysis needed to redefine the planning process and to focus on urban problems; the domain of urban housing and slum clearance, which would restrict the structure and location of planning thought; the permanency of state intervention with its requisite intergovernmental and fiscal reorganization'.

She continues:

'The new field of planning focused on the problem of inefficient and destructive land and traffic congestion, the need to separate nuisance land uses from more profitable areas, the desire to promote home ownership as a decentralizing force, and the concern to establish public services at minimal consumer costs'. (Boyer, 1994)

On the other hand, urban fragmented developments are caused by unfit socio-economic and cultural characteristics of residents for such policies and regulations. In order to undertake research and data analysis, literature related to the main goals and specific

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objectives of this research should be reviewed. International, national and local researches and debates regarding neighbourhood planning and building regulations will be shown to enhance understanding of present relevant legislative policies and the statutory framework of planning systems from a global view, going down to the local level of neighbourhood plans. Detailed results of the above measures of neighbourhoods and houses will be illustrated in the next two chapters.

2.2 Urban Planning within the Developed World

2.2.1 Urban Planning and land subdivision

Ward (2002) states that there was never a patented urban planning system, thus urban planning is always an innovation of conceptual views of planners. This occurs in capitalist countries, the United States, Japan, Canada, Australia, Germany, France and Britain. These methods of urban planning affected other countries and influenced their urban planning methods. The spread of these applications occurs the same as in business as Hall (1998) states but only a few classic theories are applicable within the context of urban planning everywhere. Most are about city or regional areas or within country boundaries. The modern movement's ideas passed from Europe to the USA. Old trends of urban planning and subdivision such as the 'Gridiron' started pre-1928 when the 'Garden City' started and remained until 1945 (Ryan and McNally 1995).

2.2.2 New towns and green neighbourhoods

The current movement of 'new neighbourhoods' was originally started by Stein soon after he visited the second garden city in Welwyn in England after the First World War. He advocated wide social goals for all projects and details of these are outlined by Lewis Mumford (1951). Moreover, it was the start of redevelopment of decaying neighbourhoods of the old cities. In general, Mumford related such movements to Britain's philosophies, thinking, and practices of housing and city planning. The creation of super blocks and the cul-de-sac concept was invented by the Germans to reduce roads costs and increase green space and provide peaceful local quarters without crossing traffic. The contribution of Stein to the neighbourhood -or as it was called housing or garden community- is the same as Howard's in the Garden City. Stein's interest was more in the design of the city than community design and yet he was considered the most urban statesman of that time. His movement championed extravagant subdivision during the 1920's and vast standardized plots for sale. With
Wright, he attempted to add aesthetic needs and human scale in the built environment by adding plants and open spaces as the primaries in housing costs. Moreover they were seeking high quality neighbourhoods and good designs. Yet they documented in the theoretic details of Sunnyside social life requirements such as open spaces, community rooms, provision of schools and shopping centres even before Clarence Perry wrote about neighbourhood units. However, their contributions should not be copied, but as Mumford recommends:

'\textit{a spirit to be assimilated and carried further, a method of integration to be perfected, a body of tradition to be modified and transmitted- and in time transmuted into new forms that will reflect the needs and desires and hopes of another generation}'. (Stein and Mumford 1951: 20)

In the planning of Sunnyside two main objectives guided Stein and Wright. They were laboratory research, creation, and challenge; and cutting costs of planning and construction by squeezing and simplifying dwelling design to reach affordable prices which were lower than normal prices at that time. Wright added open space within each block as Raymond Unwin recommended in England with no extra cost for plots to fit for American standards. The design created less subdivision to allow for more lighting. Open space was left in each block for common use of surrounding residents and named inner courts; garages were clustered separately with walls away from dwellings, this was adequate for the then rate of car ownership. Stein states that a simple type of dwelling structure is the most popular in low income communities. Moreover he concludes that a gridiron street pattern has limitations in developing a green open space within the block, and this is because of narrow blocks at Sunnyside. Open space in the middle of blocks provided peaceful and aesthetic outdoor-activities for neighbours. Variation of heights also increased advantages of the surrounding space and buildings. A variety of house types did not cause any difficulties in house sales; simple apartments cost the least. Lastly, he states that the success of housing developments requires low cost land and interest rates, adequate dwelling size, simple development, and easy and short access to work (Stein and Mumford 1951). In the cases of Radburn and Chatham he and Wright had some failures in terms of a lack of shared open space. Dwellings shared a cul-de-sac with separated backyards and a park that was not easy to access for all dwellings; this can be called urban injustice. Mixed use of cul-de-sacs for cars and pedestrians means children are still at risk from traffic; even though it is relatively slow moving. On the other side, Phipps Garden is an
example of great success for apartment dwellings. Nevertheless, in Hillside, New York, an integrated neighbourhood was planned and attached houses clustered around a courtyard. In the Baldwin Hills the pattern used in Radburn was applied in the middle zone. Subdivision wasn’t based on unit development with curved streets as they are in both zones in the north and south. Low density per acre housing was implemented and extra parking provided in cluster areas as car ownership was expected in that area.

In his conclusion he recommends that in terms of planning a neighbourhood, rather than controlling and regulating planning, it should be sought to create communities with regard to cooperation, building, contemporary and dynamic design instead of disorganized, delineating, lots or streets, and consequently static communities (Stein and Mumford 1951).

2.2.3 Unit development or subdivided community

In Europe, after implementation of other unit developments in most Western countries, the collapse in the modern movement was witnessed and a new generation of Western architects and new movement of planning methods were established. 1960-1980 was a time of vast spreading of municipal subdivision regulations. The land was left to be developed not by the owner of the plot but by the developer so the whole plan of subdivision (Ryan and McNally 1995) changed to an integrated community instead of fragmented individual plots. The role of developers is shown by Edelson (1975) in subdividing a land for plots derived from the price of land, tax regime, and distribution of potential buyers. Moreover, Edelson shows conflicts of interest amongst both developers and final inhabitants. Two years later, Erskine and Rink (1977) show using CASL (an automated subdivision) a block of land divided into lots according to municipal zoning regulations. The main objective of software is to obtain the maximum number of plots out of subdivision of land. Larson (1980) tests literature suggesting socio-economic morphology of ghetto space might develop a spatial system, but the result is that it is only a sub system parallel to an urban one to conclude development of neighbourhoods and communities over time. Then White (1985) examined two hypotheses. The first is about constraints of large lot zoning, and the second is about the inverse relationship between plot size and costs. However his work is only conducted across un-subdivided vacant lands among New York City suburbs. Colwell and Scheu show that both plot frontage and area affect cost of development and assume that minimising both will lead to low costs of development, even for rented land. Such
an argument seems valid in the Saudi Arabian land market as land price is mostly affected by frontage size, area, and moreover by street width, direction of frontage, and number of frontages. Residents satisfaction within communities was earlier tested by Savasdisara (1988) who sought to conclude urban and socio-environmental issues affecting levels of resident’s satisfaction concerning the neighbourhood they live in. Samples were selected by mail within Tokyo boundaries in 1986. In terms of land development and its costs, Colwell and Scheu’s (1989) argument that development of land is based on plot area and frontage might be reduced by regarding technological change and even lower rent values.

Technologically, Show (1991) states that site development regulations are inefficient for application in CAD. Nevertheless, he proposes a conceptual model for site codes according to municipal building regulations in many cities within the USA. This is purely a generalised conceptual model for cities suffering under a lack of local identity and certain social problems. Meanwhile, adoption of such ideas and theories may not be preferable models for all and should be created with reference to each city’s characteristics (climatic, social, economic, legal, political, and cultural). With regard to effects on urban society, Lowder (1991) criticises the interest of planners in technical issues related to land subdivision rather than concentration of effects over both state and society.

2.2.4 Neotraditional Neighbourhood Design

The decade between late 1980’s and early 1990’s was a time of neotraditional neighbourhood design (NTND) between professionals and academics (Ryan and McNally 1995). NTND is theoretically enriched by Leon Kier (1984). It is the field of evaluation of neighbourhood planning design with historic principals to reconstruct new cities and districts (Furuseth 1997). The movement originally refers to Peter Calthorpe and Andres Duany. Ryan and McNally’s (1995) concept is similar and concentrates on transportation and accessibility to neighbourhoods and related problems in new districts around the city during rapid growth. Meanwhile, the study reviews two approaches: historical context and current literature review for improved evaluation and critique of design concepts. It concludes that neotraditional neighbourhood planning started in the 1980’s. They conclude that the neotraditional planning field is in its infancy and researches should be accomplished. Nevertheless, they state that neotraditional design might lead to regional travel system patterns that may consolidate the community
destroyed by subdivisions based on automobiles. In other words, NTD is to integrate all suburbs together to form a town or city with clear open spaces and urban amenities. They then question the effects of neotraditional design on the costs of infrastructure networks (Ryan and McNally 1995). Moreover, Walmsley (1995) argues that it could be a model to join up the fragmented urban areas and cities. Inside the neighbourhood, he states that green streets, areas and parks form a walkable neighbourhood and this can be applied to the city centre and to regional level but this seems a very abstract concept to have such green areas for that level by claiming that neotraditional planning can be a power that creates urban forms in both micro and macro scales.

Solecki and Welch (1995) explore how urban parks can surround landscape or green belts between neighbourhoods and around the city. They regard the function of urban parks as reducing over-use of open spaces. Parks studies were selected from different socioeconomic neighbourhoods.

The new urbanism trend of redesigning neighbourhoods in America is directed to decreased usage of automobiles and separation of pedestrians and cycling routes. This movement calls for small neighbourhoods. Cervero and Radisch (1996) conclude that leisure trips (local shopping, visits, playing, and recreation) occur more frequently in such small neotraditional neighbourhoods than in others. Such trips are mostly either by walking or cycling. In general however, car dependency is very clear in these case studies, especially for longer trips; car ownership can be reduced if the neighbourhood is pedestrian oriented. Yet their approach is only in terms of transport with respect to the similarity of economic references of residents in both neighbourhoods and their characteristics. They conclude also that coherence between the 3d’s (design, density, and diversity) is likely to enhance the built environment of neighbourhoods. But no attention is given to separation of dwellings within each neighbourhood and social relations between neighbours, where most dwellings are detached ones (Cervero and Radisch 1996).

In 1997 Furueseth presented a model of neotraditional planning or 'traditional neighbourhood development' (TND). The model tests its efficiency regarding the neighbourhoods and their functions and whether physical urban form does affect social integration and development. The model is based on a new land planning approach perfected by A Zealous group and urban designers such as Andres Duany and Elizabeth who are considered ‘the best known American neotraditional designers’, (Furuseth 1997).
2.2.5 Physical Measures and principals of Neighbourhood Unit

In 1992 Duany and Zyberk allocated certain spatial characteristics for the neighbourhood model as optimum. Elements of neotraditional planning to be implemented in neighbourhood development are: scale; density; land-use mix; pattern of streets; pedestrian's routes; character of place; and land regulations (Furuseth 1997). This doesn't mean that land subdivision regulations for singular dwelling units are applied in dwelling units of neotraditional neighbourhood or block. Integration within the community of the block requires implementation of NTND principals. The summary of these principals is that the optimal distance between edge and centre of the neighbourhood is a quarter mile; it has mixed use, amenities and activities; interconnection between buildings and traffic; and priority for public spaces and civic buildings. In this manner and intention, neighbourhood open space should not be public but semi-public or semi-private if possible to engender a sense of belonging in the community to one neighbourhood, as it is mentioned that neighbourhood development is towards a small self-contained community. Duany and Zyberk in 1994 suggested a size of around 150 acres (607,628 m²) with assumption of maximum 5 minutes walking time from centre to any dwelling within the neighbourhood. However, Calthorpe in 1993 assumed 10 minutes walk time. These assumptions led to a rise in the size of neighbourhood units from the first assumption of a small community of about 450-550 households in Duany and Zyberk (1991), 1500 households according to Calthorpe (1993), and between 600-2,250 households according to Nelessen (1994) as stated by Furuseth (Furuseth 1997). In all they are not small community and over sized neighbourhoods.

Interconnection between traffic and dwellings in the neighbourhood in the design process is intended to give control over road safety; smooth traffic flow and to reduce dependency on the car for local trips. Breaking the grid pattern; use of cul-de-sac; narrow routes, short and curved 'loop' street segments are techniques used in this development. Furuseth states that Calthorpe and Nelessen recommend a maximum speed of 15 and 20 m/h for transport.

2.2.6 Evaluation of Neotraditional Planning

Sirnivasan states that neotraditional and pedestrian oriented development affects behaviour of travel within short distances more effectively than other contemporary developments and cited Ewing et al (Simivasan 2002). Measures are applied in a GIS
model for land-use, spatial character and accessibility. The other physical aim was to examine non work trips to determine choice of transport modes in planning.

Regarding the alternatives shown in Fig.1 shown by Furuseth (1997), even the conventional model seems safer than the neotraditional one. Street crossings intersections are greater in the latter. The story is not only to provide walkways and street crossings even if speed is very low, because the risk is there and not all drivers will consider speed limits. Yet the conventional model creates more private traffic through a cul-de-sac system. Moreover, commercial centres should not be on streets far from the inner-area residents. The principal of a self contained community is not reflected in the design but it is a more controlled community in terms of use with development codes mostly determined by the developers who use less flexible building measures, as Furueseth states (1997). On one hand, he argues the failure of neotraditional planning is due to shaping the morphology of communities without scientific analysis and relying on the effects of design on behaviour. Nonetheless, he states that Muschamp argues that neotraditional projects also lack functionality of neighbourhoods. He puts its success down to media publicity around projects, and the role of developers using consumer nostalgia in marketing of supply demands. Yet he states that most of the recent neotraditional planners are real estate agents of VIP views who don’t intend low density, but more rental, and multi dwelling options are mostly shown in their projects.

Duany and Zyberk, and Calthorpe new towns do not have apartment dwellings, and in other places there is neglect of low income groups and some dwelling are too small in size such as in Seaside (450 square feet which is equal to 41.8 m²). Inflexible codes of neotraditional developments for land use caused a lack of some functions and necessities that are lacking in some other urban areas.

Yet Furuseth concludes that:

'Neotraditional planning reduces all issues to visual dimensions. In the process, it sheds the vitality of small town and neighbourhood that it tries to represent.' (Furuseth 1997)

On the other side, the UK alternative for ‘Urban Village’ was ‘Poundbury’ proposed by DGXI² of the European Union and HRH the Prince of Wales as stated by (Roberts 1997). Such an alternative is proposed with high standards of amenities and low density with (30-50 p/acre) (calculated from 3,000-5,000 capita within 100 acres), and 1:1 ratio

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² Directorate-General of the Environment, Nuclear safety and protection of European Commission
of jobs. The principal model was the small size of community of 3,000 capita to strength the quality social relationships as sought, but coupled with some exclusion and limitation to reduce social unrest. However, 3,000 seems a very large community to have social relationships and to know everyone. Moreover, urban land will be larger and travelling distance will increase the danger to women and children. Nevertheless unsafe alleys have been criticized by policemen (Roberts 1997).

Regarding the issue of city and gender, Roberts argues similarly to Valentine, Elkins & MacLaren in saying that public space is for parade and exchange encounters, informal meetings, spectacle, and to see and be seen. This only shows the function of public space but they do not mention semi-public places such as cul-de-sac space and what the remedy for its isolation might be as in Spencer (Spencer 1997). It does not show how social relations can be in the semi-private areas or how views can be totally different as in Hoash in Islamic cities and from cultural studies as tackled in Hall’s book (Hall 1966). Rowland evaluates the concept of Apex’s Traditional Neighbourhood District saying that neotraditional planners such as Elam (land planner of the project) have ‘got to update the concept to meet local standards’ (Spencer 1997). Neotraditional planning should not only have a nostalgia issue but do more to tackle the spatial and social effects of globalisation on cities and the resulting post modern problems of fragmented fabrics in the social, cultural, and spatial dimensions. Moreover he recommends that planners and urban designers should have further understanding of social relations of residents who live in the city before they plan (Roberts 1997).

Smith and others (1998) stress this concept of quality in the physical environment to meet society’s needs and desires. They state the importance for designer and planners to update standard codes of environmental construction to upgrade its quality and consequently the quality of community. This means that they examined satisfaction levels of the urban community regarding the environment they live in and social and psychological dimensions, such as the principals of: ‘liveability, character; connection, mobility, personal freedom, and diversity’ (Smith, Nelischer et al. 1998). On the other hand, urban quality is related to: ‘block, building, streets, pedestrian ways, open space, vegetation, and features area’ (Smith, Nelischer et al. 1998).

2.2.7 Neotraditional planners and organism wide spreading

The fundamental aims of the organic metaphor are useful for understanding the whole urban city by building its elements and units. Thompson-Fawcett refers to a limitation
of organic or neotraditional concepts to lack of analysis. Moreover, the re-making theory of historic cities as she states that it is for more urban control noted in the compact city, but most of such theorists have shifted from focus of design to concern of the public realm around open space (Thompson-Fawcett 1998). On the other hand, Leon Krier is considered by Thompson-Fawcett as the strongest follower of organic metaphor in Britain, Europe and North America. His keys to reconstructing the city and maintaining the community are size and mix of its elements of spaces and buildings. Patterns of spaces and buildings take their identity from the city, not the opposite, which means that the traditional urban pattern is a result of cultural continuity issues such as language, from one generation to another. Yet he shows European cities only as design and form to set their basic dimensions and ratios of urban spaces (Thompson-Fawcett 1998). He shows the mechanical or industrial growth for both urban centres and suburban development as vertical in first and horizontal in last. Consequently he describes the urban fragmented developments that occurred instead of the integration traditional ones and the consequences of that fragmentation. In contrast, he shows the organic growth as urban squatters and how to prevent the occurrence of metropolitanisation. In other words, for limiting the size of the city or to achieve 'compactness' to its right form based on a 'city within a city', this requires building blocks or urban quarters and each one must have the same quality as the others. Such theoretical notions and visions for the city and space was a power mechanism for adoption, influencing, and policy making (Thompson-Fawcett 1998). However, the Department of Environment in Britain has examined the applicability of the Urban Village within existing planning systems for development plans, especially in areas of poor condition. There are more than 30 projects claiming the concepts of an urban village.

The great partnership was Krier and Duany in Congress for the New Urbanism (CNU) in the USA. This congress represents great literature and implementation of projects based on Urban Village principals, plus high levels of democracy and community responsibility in neighbourhoods. Moreover, buildings should be cohesive, diverse in construction, and flexible for future change (Thompson-Fawcett 1998). Poundbury was planned by Krier as four quarters each of 800 households with 40 hectares (20 households/ hectare) with all amenities, dwelling sizes, and mixed uses. Only architectural issues such as materials design and patterns are implemented. As Thompson-Fawcett states
"I think it works. I was astonished because it really feels like it has been there for a long time, which is amazing" (Thompson-Fawcett 1998:183)

The pattern of subdivision is based on loops and cul-de-sac concepts which are the same as traditional Dorset patterns. However such low streets which surround the clusters of buildings have not left, for example, any spaces for playing as noted in the principals. They are only facades if they do not supply actual needs and desires. But because it is culturally a continuity of the old city then it works with all the detailed codes for building that are adopted culturally from traditional planning in old cities and satisfies in the resident’s minds the required conformity, even if codes are very controlled ones.

Madani pour regards views of CNU to urban problems such as overcrowding, air pollution, slum areas, urban growth and lack of urban space for community and suggests they are mainly caused by unmanaged development during the industrial era (Madani-Pour 1997). Enlarge urban villages to the scale of a city, states, and cities with functions for dwelling, jobs, recreation, and transport are rational in relationship and yet the modern urbanism of CNU is widespread and adopted around the world (Madani-Pour 1997). Later with an optimistic concept, he argues that all coherence of development concepts of CNU are replaced by fragmented views and practises and he states that only postmodernism connects fragmented certainties. Yet Tony Price argues that planning zoning is against the cultural organic growth that formed traditional cities by saying:

‘If you let ordinary capitalist management operate, if town planners stop trying to zone for function, these suburbs will evolve dense networks of streets and squares that characterise the town of our dream of our past.’

As stated by Krier via (Price 1999)

2.2.8 Space and Place and fragmented neighbourhood

With current planning efforts and development patterns, new suburbs are more modernized than either transitional or traditional ones. Spatial order of those developments and culturally and politically fragmented cities led to dynamic land-use and transport planning and dispersed developments far out in the suburbs with no choices for residents for their places and spaces to live in. Filion et al (1999) presents a model for space, place and proximity that examines dispersion of urban areas. After they define their notions, they compare functioning in both the traditional city and dispersed city regarding their spatial preferences and proximity to amenities. After they
allocate all amenities in the study area, daily trips of their samples, and residential densities, they conclude the importance that residents give to three notions (space, place and proximity). Consequently, reasoning of mobility and transferring to other areas is related to socio-economic preferences. The highest ratios are noticed because improved dwelling (space) then better neighbourhood (place), followed by location (proximity) especially to shops, work, and schools as shown in both tables 4 & 5 (Filion, and et al. 1999). The majority of their samples show house is as important as neighbourhood, but very low percentage consider house more than the neighbourhood. Filion states that the main difficulty for policy implementation is the alternative to such dispersion.

Yet, Emily Talen (1999) questions the neotraditional design, and asks if any alternatives or creeds can afford the same result of forming the sense of community within neighbourhoods with a different philosophy? She answered that there is a need and research should be directed to determining the level of the sense of neighbourhood within special designs. At the same time she admits that neotraditional development is no more than meeting the resident's desires of spatial design, but not forming behavior of the neighbourhood (Talen 1999). It seems not to be the issue of creating better behavior of residents, but behavior of economics and subdivision as Thorsnes (2000), Gillen and Fisher (2002) argue that developers control size of lots for more revenues. But Gillen and Fisher's findings show that in the UK, developers and landlords, only impact similarly on 10%, while the major role is left to planning with 68%. Yet, planning policies and regulations are those which cause urban fragments to disperse in sprawls around cities and far from developed lands. Madanipour and Bevan state that the effects of urban policies are not just felt locally but also globally; "the symptoms led to concern about the fragmentation of the social world". (Madanipour and Bevan 1999: 5).

Moreover, they explore how such social exclusion policies caused other social and economic problems, and consequently led to social disintegration, and the same will lead to segregation in the neighbourhood of 'Walker' from other parts of the city 'Newcastle upon Tyne/UK' as it would be a pocket for urban deprivation and crime even if it has a strong sense of community, according to Walker Ward Statistics. This is a special case because the decline of the ship industry forced residents to upgrade their qualifications and seek alternative employment. This will change the place of the 'neighbourhood', to a fragmented space removed from urban amenities, employment, and social relations.
In this regard Bridge states that decentralised segregated consumption of space and neglect of city importance as a central place caused a decline in social relations. He suggests in his book that reconstruction of planning is possible to apply within a contemporary city for changing its urban spaces. Moreover, he argues that Dewey's idea comes from re-contracture of technology, bodies, communications, and fragmented experience of space over time within the city (Bridge and Watson 2005).

2.2.9 Neighbourhood as liveable place

Neighbourhood has recently assumed a dilemma that interests urban designers, architects, geographers and planners. Their studies are about relationships between neighbourhoods, community, and effects of new cities formed with ICT. Neighbourhoods are not virtual ones, but real ones where people can live, move, sleep, play, and do all of their physical activities in reality within real open space, but not as same as chat rooms, games rooms, or what ever rooms which make un-trusted, shallow, short, relationships. This is because entrants of such rooms share interests, but differ in most other cultural things such as values, norms, traditions, costumes, and measures which are mostly generated and strongly related to physical geography or built environment either of the region, city, district, or neighbourhood. Nonetheless, both the cultural and physical issues of people help a 'community' build up and form a neighbourhood. It is the place where the public meet and interact with each other. Neighbours encounters make the first strategic step for relationships. Discussions, asking for a little help, or help in emergencies are all events that are mostly and strongly related to the space that neighbours gather in and strengthen the relationship between people and add more respect, trust, and responsibility for each other (Bridge and Watson 2005). It is the neighbourhood that hides inside it a unity of such urban space not only physically but also emotionally, socially and culturally. Rather than roads and infrastructure networks the city seems to be a social network of personal, family and neighbours attitudes and behavior as Bridge (1993) argues with Smith's suggestion that group relationships occur more in working class areas because work life is not a satisfactory identity for members, so they are looking for a social identity and unity of structure. He quotes what Smith (1980) says:

'It is precisely the structure separation of work from the rest of life that has driven many people inward in search of the meaning, unity, and integration that a fragmented social structure no longer adequately provides' (Bridge 1993: 6)
But in terms of network’s size Bridge leaves it changeable with a geographical
proximity around a community which is defined as a group of households with a
locality which are dependent internally as are others with a similar social boundary. He
states that social relationships are more important than membership of a geographical
location (Bridge 1993). Madanipour supports this argument and adds that a
neighbourhood’s social community is the primary part of a social spatial world and
quotes Bott’s saying:

'A family does not live directly in the total society, or even, in many cases, in
the local community. The effective social environment of a family is its network
of friends, neighbours, relatives and particular social institutions. This is the
primary social world'
(Madanipour and Bevan 1998: 46)

This argument is based on his own case study community, culture, and location. In
most cases, social fragmentation in vulnerable neighbourhoods is caused and
accelerated by the response to globalization, as stated by Judith Allen3. Yet this
negatively affects social life within neighbourhoods as a livable space. Yet the new
concept is to consider residents of neighbourhoods as active with their rights and
responsibilities as citizens (Madanipour and Bevan 1999). However, before the urban
planning policies and regulation should be changed to avoid socio-spatial exclusion in
contemporary neighbourhoods. With regard to this, Madanipour states that such
exclusion occurs in European cities at both national and local level. Again, he agrees
with Allen’s point of view that the reshaping of those cities was a response to
globalization. Yet, implementing such specialist reconstruction cost a lot in terms
social fragmentation and a decline in quality of life for the majority of the public. It is
not only poverty, but more about citizens' rights in term of integration within whole
social context. Madanipour argues as referred to Benn, Gaus, and Habermas that
categorizing space between private and public may be a cause for social exclusion if a
section of society have access, and control it more than others (Madanipour and Bevan
1998). But this will not be the case if all neighbourhoods and cities have the same
facilities with equity. A neighbourhood is a livable place where space and society are
knitted with cultural context, a place where residents choose their own settings for
components, facilities, even trees and other landscape elements with regard to their

Jessica Kingsley Publishers Ltd., p: 46
knowledge and the style they like, and which reflects their own identity. Although this characterized neighbourhoods in the past as Krier argues that traditional neighbourhoods are changed as having their own character, identity and human scale. He shows that the basic elements of urban design are blocks and buildings, but pays regard to the order of buildings within the block (Krier 2003). However, control in urban policies became over-important and operated subdivision, landscaping, accessibility and activities, and thus individuals became more limited in their cities and neighbourhoods, and sometimes within their own homes. On the other hand, organic growth and incremental developments with flexible political and legal structure can build up natural neighbourhoods that suit residents, and satisfy them with a place to belong to, with local identity and freedom to move within. Yet, although they can draw up their daily needs in such neighbourhoods, how will they fund and manage to provide either from their own resources or from governmental agencies? In other words, they have to be involved in the planning process of their neighbourhood, not formally, but socially and locally co-operatively. Therefore he states:

*Space, therefore, can be utilized in both ways* (either neighbourhood or barrier). *What is needed is an urban form which allows freedom and security but not by segregation and exclusion.* (Madanipour and Bevan 1998: 46)

In this regard, Hillier states that two stages form the city. The first is vertical and is the sum of the built forms which form the spatial pattern. The second is when spatial pattern shapes social behaviours of the sum of buildings to form a living city -or neighbourhood, in other words the city is socially constructed (Hillier 2003). But this morphology of social construction is based on an overlapping of personal, interpersonal, and impersonal space hierarchies. This kind of space division affects individuals' imaginations, and consequently their behaviour within spaces and how they interrelate and construct social formation relating to spaces (Madanipour 2003).

2.2.10 The city as a complex system and Space Syntax

By looking at a city as subdivided spaces, Madanipour (1998) shows types of spaces and their differentiations and relations with mass and time. He argues that there are huge gaps in understanding space dilemmas, but what should be done is an analysis of daily life relationships with space production to reach an understanding of the dynamic of space. He argues that the greater the accessibility to space and decision making, the more freedom the residents can have. Less access creates more exclusion. Madanipour
sees space as playing a main role in integration or exclusion of urban society within cities and neighbourhoods (Madanipour and Bevan 1998). Although the city seems a complex system, Hillier proposes to simplify complexity to a deeper or lower level and study parts or components as ‘simplex ties’, and then aggregate them to form a real complex city as a whole. This means that individual subjects or units of the city can be generalised. In other words, it distributes the city into districts, then to neighbourhoods, and last to dwellings, and if needed, dwellings to rooms or individual spaces. This is basically the start of pure private space. Hillier (2003) then created Space Syntax software to analyse all levels within the city and (Space Syntax Org 2004).

Space syntax is the organic construction of spaces within a dwelling, neighbourhood, or city. Its techniques and analysis was firstly conceived by Professor Bill Hillier and his colleagues at The Bartlett, UCL in the 1980s (Laboratory, 1995). Hillier (2003) states that human intervention in terms of cognitive subject affect the form and working of the city. Moreover, Bellal (2004) states that:

‘The primary hypotheses space syntax analysis is that topological structure of space is a fundamental means by which society constitutes itself, and thus, the special patterns of building both embody and shape social patterns, which are (the social-spatial principals), in some sense, the inverse of each other’ (Bellal 2004)

Space syntax is linked by Hillier and Hanson to the inner social logic of inhabitants where importance is ascribed to specifying the shape for modelling a real world but the concept of shape hides fundamental relational notions that enhance human spatial structure (Bellal 2004). Hillier allocates the logic of what ‘unit’ and where spatially’ the order of units take place synchronically within the city or cluster by individuals in old cities, but this does not exist in modern grid-iron towns. Consequently he states that the form of the city begins with exact aggregation of buildings to form a living city with a system of relations (Hillier 2003). But his main analyses are about route of movement more than social relationships of neighbourhood, which are generated by the built environment. He goes far from the main point of ‘Social Logic of Space’ to a Movement Logic, which is an abstraction from cultural issues to systemic ones which form the city by spatial arrangement and order.

Hillier illustrates in Figure (2.1) shown below the spatial logical order of dwelling, either adjacent houses or a ‘terrace’; or on the other hand randomly dispersed dwellings and spaces with an unrecognisable pattern. He proposes that by placing the next dwelling adjacently and geometrically, either a court or plaza can be formed which
completes itself. The next dwelling may be placed in front of the two dwellings to complete the other row of houses and form the two sides of the street or route (Hillier 2003). But after the aggregating of such clusters of dwellings on higher levels such as neighbourhoods, town or cities, Hillier states that more than individual level:

"Higher order of co-ordinates that we can think of as a kind of synchronisation, since over and above consistency in the local rule which put the system together there is a clear 'all at once' quality to what we represent to ourselves at the level of the whole object." (Hillier 2003)

![Logical orders of dwellings to form up row house, court, plaza, or street](image)

Figure 2.1: Logical orders of dwellings to form up row house, court, plaza, or street

It is a summery of figures (1, 2, and 3) of (Hillier 2003) for and named by author as been stated by Hillier in same paper for easy understandable descriptions of patterns those resulted from logical allocation of dwellings

On the individual level of dwelling, Space syntax in Gamma analysis is a diversion of the design plan into special logical structure, abstracting rooms from their shapes and
sizes (Tipple 2000), and starting at the point of entrance from external space. A Line or
string means a door or arch with a barrier that leads from one space to another. Each
space is shown as a segment or circle. The linear structure of both is known in
architecture as an ‘enfilade’ when there is no choice but to pass from one space to
another (Bellal 2004). In the opposite case, when strings connect each segment with
others in a network it is called a loop or ring shape. The degree of ring or loop is
against control of space; a loop or ring always disperses control over space and though
social interaction. A well controlled space means that it is the only pathway through
one space to another, or to other spaces such as a hallway. A gamma diagram also
shows depth from the starting point (Tipple 2000). Mathematical interpretation of
gamma analysis is not used here, where only diagrams have been used to represent
quality of integration of spaces within dwellings, and depth of dwelling as a whole.
Single space depth is also shown in diagrams for some illustrations and analysis of
dwelling components in both chapters seven and eight.

2.3 Urban Planning in Arab Muslims Countries

2.3.1 The origin of the first Islamic concept for community and Planning
Islam first emerged from the heart of the Arabic region (Hakim 1986). Al-Madinah was
the first capital city for Arab and Islamic Nations for fourteen centuries. Reviewing the
Arabic and Islamic planning literature is necessary for this study. Ibn Khaldoun in his
introduction was the first who mentioned cities and their decline by saying that unstable
conditions of Islamic cities led to the decline of great cities. Moreover, a very early
description about Islamic cities, especially in Mecca ‘Makkah’, and Medina ‘Al-
Madinah’, was published by (Burton 1964). Traditional Urban Planning in Islam was
not a field that followed or created individual policies and regulation set by academics,
architects, planners, urban designers, or geographers. The majority of urban policies
were set by Shari’ah law, based on Qur’an Verses and Sunna Hadith and other Islamic
law sources forming the basic principals of a city shaping system as stated by (Bukhari
and (Shamsuddin 2004)
Al-Kaki explores urban growth and development in Al-Madinah throughout history.
Firstly, he starts from the fragmented human settlements and various tribes before
Islam, and then how they were integrated as one community after the Prophet (Peace to
be Upon Him) migrated to Al-Madinah as stated by Al-Hathloul and Mustafa (Mustafa 1981). The result was as Bianca states:

"A breathing and animated urban structure, projecting a radiant inner unity which is fundamentally different from the sterile uniformity produced by more mechanical modes of addition or subdivision".


Both Al-Harrbi and Kaki explore very detailed architecture of the mosques during history with regard to area and shape. But Kaki was more detailed in terms of other amenities as they were upgraded in the Period of Caliphs after Prophet (Peace to be Upon Him), and during Umayyad, Abbasid, Ayyubid, Mamluki periods based on what was described by Al-Samhudi and substantial Arabic resources, until the contemporary Saudi era (Kaki 1998). Al-Harrbi shows the route taken by the prophet (Peace to be Upon Him) between fragments of human settlements and clans by maps sourced from Naji Al-Ansari 1996 (Al-Harrbi 1998). Both Kaki and Al-Harrbi show how the Prophet then subdivided lands around the location he chose for his house and mosque, and relates how the clans distributed themselves in an incremental development process. Moreover, they state that the houses of the Prophet (Peace to be Upon Him), were about 4-5m X 4m, which is only an inner room and lobby (Al-Harrbi 1998), and (Kaki 1998). Kaki states how land was subdivided and how the process set the policies for land development but draws a map for the development of the Mosque area and a few houses around the mosque. On the other hand, Al-Harrbi explores the functions of the courtyard for the first Islamic community and draws up a detailed diagram for the fifty houses of the Prophet’s (Peace to be Upon Him) wives and companions. The first city formed with Islamic policies was Al-Madinah as will be shown in chapter three and will be detailed in chapter five. Other great Maghreb like Al-Fustat, Tunis, and Rabat were cities formed in the golden era of the Islamic Nation and mostly affected not only by Islam but more deeply with the schools such as Maliki school (Hakim 1986), and (Mortada 2003). Yet the typical urban form of historic Arab Islamic cities grew in compact integration of small and larger precincts with its own open space as stated by (Bianca 2000).

Later, as mentioned above, decline, death and reform of great cities occurred when the nation was divided into small countries, and the colonial era took over. Such religion, traditions, norms, values, and customs which were part of the culture that formed
community identity were consequently reflected physically in its built environment. Yet most Arab Islamic cities have the same urban pattern and architectural references.

2.3.2 Photocopy of Western Patterns, Models, and urban systems

Muslim cities during the Industrial Age imported Western concepts and theories of town planning. It was when many capitalist countries were seeking to increase their own profits through cheap labour and natural resources in Third World counties. Impacts of European technologies, economies, growth, and political ambitions could be seen in Muslim cities up to the 1960's. However when most governments gained their political independence, nationalism increased the impacts which caused ill-controlled development (Bianca 2000). Modern Western concepts, ideologies, and urban models formed most lines of Muslims cities such as Cairo after independence from the Ottoman Empire and through building the European part of Cairo to the southwest of the ancient Fatimi and Mamluki areas (Abu-Lughod 1971).

Though urban planning systems, structures, processes and techniques were mostly imported from those capitalist countries for local needs it was done without revision and adjustment, mostly between the fifties and seventies. Nonetheless, Western teachers, professionals and consultants were welcomed to guide development within Muslim cities, thus cultural independence was not yet established. An example was in Libya where physical planning was unknown until the oil discovery in 1973 when extensive assistance by UN and international consultancy firms prepared the development plans (Awotona 1990). Those high class groups of Western leaders and development set their high ideal living standards from Europe upon the economic condition and generalized them as local ones. Western concepts were applied in Iran. New town strategies were applied in large cities such as Tehran, Esfahan, Mashhad, Shiraz, and Tabriz (Atash and Beheshtiha 1998). Moreover, the colonial change in the framework of planning was experienced in Umm-Durman and Khartoum (Ahmad 2000). Zatter and Hamza (1997) state that foreign involvement and assistance affecting local urban development projects has been experienced in Egypt.

In Saudi, adoption of such urban planning modes, institutional structures, procedural frameworks, investments priorities, and technical approaches, was unfiltered to meet local needs and local identity. Meanwhile, the governmental planning efforts and the private sector's profits were fragmented randomly and without co-operation in managing the vast urban growth within the urban land infrastructures (Zahid 1996).
Chapter Two: Literature review: Urban Planning and Neighbourhood Subdivision

A Roman grid form of streets was adopted in most Saudi cities exactly like Riyadh, or partially similar to Mecca and Al-Madinah which are radial cities according to their religious functions and topographies. Vehicular traffic became a major issue in urban planning which enhanced the city's expansion but also raised many other urban problems, such as privacy of residential units from houses to flats, human scale in high rise building, inter-relations between housing and markets, and between physical lack of open spaces in traditional neighbourhoods, and socio-economic circumstances. Rapid growth in modern districts and neighbourhoods is occurring all over Saudi's cities and coupled with growth of informal areas of poor classes who have immigrated from rural areas. All these require new urban planning innovations and adjustment of standards and norms to fit with the socio-economic characteristics case by case in each city.

Bianca states:

"Beyond providing substantial social and economic yields, the vernacular mode of development also constitutes a formidable cultural potential, capable of regenerating and transforming traditional cultural patterns from within. By operating at grass-root level, it will avoid the risk of superficial transfers or dependency on foreign ideologies and can eventually generate a meaningful new system of cultural references".

(Bianca 2000)

2.3.3 Fragmentation due to fast development and urban Growth

A decrease in economic resources is not the only problem in terms of urbanization, but also lack of information, the broker's role, and market control are the main causes of delay and fragmented developments in India (Rath and Routray 1997). Fragmentation was experienced in India because of urbanization, deterioration of farm land, and the consequences of land subdivision and holding schemes (Ram, Tsunekawa et al. 1999). Fragmentation of urban developments occurred in Saudi cities when the Kingdom witnessed a substantial growth of oil revenues between 1952 and 1975, and because of REDF (Real Estate Development Fund)\(^4\) in 1974 (Daghistani 1991) and (Zahid 1996). In Al-Madinah alone, this led to construction of 363,927 dwellings within that period (Al-Harrbi 1998). Yet MOMRA\(^5\) set up the Urban Spectrum, or urban boundary policy. Zahid mentions that the main drawbacks are fragments of urban blocks around cities

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\(^4\)Real Estate Development Funds pay interest free loans those cover 70% of construction costs, and to be payback within a period of 25 years

\(^5\)MOMRA Ministry of Municipal and Rural Affairs in Ar-Riyadh, Saudi
and their peripheries (Zahid 1996). This occurred in Al-Madinah in both urban development areas outside the old city, and in the design of dwellings of imported models. Yet urban problems started to increase, as stated by both Al-Harrbi and Al-Saati. Services and recreational amenities were lacking in new districts and the problem of social fragmentation began (Al-Harrbi 1998) and (Al-Saati 1987).

Urban expansion and huge populations in big cities cause the outstanding problem of vacant land within cities and the spread of residential neighbourhoods far away from each other and the city centre. In this manner, Brennan states that Third World cities have experienced dramatic population growth, which leads to pressure on housing and redevelopment of basic needs, but they

"are ill prepared for coming dramatic expansion of their cities. It is not certain that even the limited progress of the past will be sustained in the future. The problem of land and housing are so severe that it is futile to pretend they can be solved. They can only be reduced".

(Kasarda and Parnell, 1993)

Thus, difficulties of coverage due to high demand from municipal services and utilities increased. Consequently this increases costs of construction, operating and maintenance. Nevertheless, existing networks are imposed efficiently. Thus the urban spectrum should be continually applied, coupled with the actual need for the city's extension. Garba recommends a huge reform in administrative structure to improve management of the growth challenge in Riyadh city (Garba 2004). But it seems that most cities in Saudi in general and Al-Madinah in particular have increased their urban spectrums with fragmented developments and waste lands by using policies and regulations to control neighbourhood plans. Thorough investigation should be conducted in both levels of neighbourhood and then even deeper inside the micro-scale of dwelling units to revise such policies and regulation, and then adjust them to be relevant to local characteristics.

2.3.4 Urban change and loss of traditional identity

Adoption of such urban planning modes, institutional structures, procedural frameworks, investment priorities, and technical approaches, was unfiltered. Al-Naim argues that modernity as a concept is strongly related or interpreted as westernising in Saudi Arabia. However resistance remained even after the built environment was changed. He states that Al-Hathloul (1981) and Fadan (1983) show the negative
impacts of westernising on Saudi cities (Al-Naim 1998). Traditional heritage has been lost, especially in the richest Arab countries who have demolished their historic inner cities and centres seeking development within a short period of time. Bianca states this saying:

"Paradoxical as it may appear, it is the richest Arab countries which have lost most of their traditional urban heritage, since the abundance of financial resources and ensuring developments pressures have led to wholesale demolition of most of their historic centres in a short period of time". (Bianca 2000) p: 175

The change affected most gulf cities, most of them experienced huge change in their urban morphology as consequences of fast socio-economic and cultural shift of residents; Bahrain is an example (Hamouche 2004). Saudi’s cities are good examples, where conflicts between traditional and modern forms have occurred, not because they are fundamentalist or technocrat concepts, but are regarded as social, economic, and cultural realities. Al-Madinah in Saudi Arabia was one of those cities. Such green areas as surrounding landscape or green belts were applied in Al-Madinah between some traditional neighbourhoods, as will be shown later, as Solecki and Welch state above (Solecki and Welch 1995).

Al-Madinah was one of those cities changed over time due to development or decline during history. Al-Hathloul and Mughal consider elements of identity are reflected by its physical landmarks, activities nodes, mosques, roads and urban patterns. They state that hierarchies of mosques in Yanbo provide a basis for land use organisation regarding patterns of distribution (Al-Hathloul and Mughal 1999). But sadly, it was decided the old traditional Madinah should be completely demolished, not by stranger politicians, but by the local Municipality and other governmental sectors; not by the air forces and bombs, but by bulldozers and trucks owned and driven by local people. Hakim stated about this decision that

'It is a crime in the human heritage, traditional architecture, and culture'.

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*Besim Hakim met with author in First conference of 'Heritage, Globalization & Built Environment, 2004, Bahrain' both have their contribution on that conference as shown below:
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The author directly replied at that time that it was an essential decision, and the Al-Madinah People have known since the Prophet’s immigration that they are as stated in the Quran:

’But those who, before them, had homes (in Medina) and had adopted the Faith, show their affection to such as came to them for refuge, and entertain no desire in their hearts for things given to the (latter), but give them preference over themselves, even though poverty was their (own lot). And those saved from the covetousness of their own souls; they are the ones that achieve prosperity’ (MOIA)† (Ministry of Islamic Affairs)

Yet the author meant that residents of Al-Madinah always generously gave guests, ‘pilgrims’, the nearest area to the Prophet’s Mosque even if they have to travel far to their homes and lose the traditional old city which was demolished. But Hakim meant the big loss of lessons which have been missed regarding Islamic traditional architecture and planning by all who might be interested. Omar Yousef, an old architect in Al-Madinah, was interviewed on a television programme regarding the Old Madinah. He stated that demolition of Old Madinah was a big lose, and it was the responsibility of both architects and planners who did not defend that heritage and transform its lessons in what came after in new developments (Yousef 2005). The lesson is that which Bianca states:

"The formation of the urban structure is not subject to purely quantitative division of large space into smaller fragments but based on an incremental or "organic" aggregation process, organizing in the definition of socially relevant micro spaces which are then connected into larger units"

(Bianca 2000), p: 207

Moreover, he adds that open spaces and pedestrian networks are integrated in an urban form of traditional cities as the basic components of urban structure from the starting level, which is in clusters of dwellings that avoid wasting land in urban systems (Bianca 2000). This is a suggestion for guidance in how to sustain traditional urban form in both quality and quantity, and how to reflect them in a policy for contemporary and future changes in the built environment.

† Ministry of Islamic Affairs website, 2005
2.3.5 Social Dispersal and deprived Neighbourhoods

Social dispersal in Saudi is viewed by Al-Fozan, who sees urban expansion as being similar to fat in the human body. He states that transferring from old serviced districts to deprived ones is only for change and a desire to have more club facilities inside private villas (Al-Fozan 1993). Al-Harrbi shows in the map adapted from Naji Al-Ansari (1996), the route of the Prophet’s first immigration to Madinah. In addition, the map shows how clans were fragmented before Islam came to Madinah. Nowadays, and after 14 centuries of Islamic integration in human settlements, urban developments are fragmented again, not because of the loss of the Islamic religion, but because informal growth has occurred during the last three decades. Nevertheless, new urban developments also grew far from city boundaries, services and infrastructure hubs. Al-Harrbi also shows a map of the urban spectrum sorted from Al-Madinah Municipality in 1987. The map shows how new plans for urban developments grew far away from the vacant land available nearest the inner city.

Moreover, he examines satisfaction levels amongst Pilgrims about accommodation in the central area around the Prophet (Peace to be Upon Him) Mosque, and amenities and services in other neighbourhoods, but does not mention the neighbourhood as a concept for planning of residential areas, either in the outer zone, or in the central one. Of course his central focus is given about architectural issues only for different schools and cultures of pilgrims coming from all parts of the Islamic World. On the other hand, local residents are neglected in the analysis, despite the data they put into their introductions about norms, standards and measures for amenities within residential districts. Kaki’s view about urban planning and development for Al-Madinah is very general and mostly what has been set as policies by governmental agencies, but Al-Harrbi’s point of view is for the city in general, to afford accommodation for all Muslim pilgrims, and is very specific and qualitative regarding the measurement of their level of satisfactions to be implemented in housing within the central area. Kaki made the main recommendations regarding new neighbourhood planning. Firstly, designs of both dwellings and residential clusters or ‘neighbourhoods’, are related to Islamic cultural

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10 Figure (2.17), p: 48 sourced from Naji Al-Ansari (1996) Omarat wa Taswiat Al-Masjid An-Nabawi Ash-Shareef A’br at-Tareeq ‘Arabic’.
backgrounds. Secondly, a competition with a prize should be held for the best design created using a component of Islamic traditional patterns. Lastly, the final winning design should be sponsored and implemented and then after residents have lived in it, be examined again for an evaluation (Kaki 1998) and (Al-Harrbi 1998).

2.3.6 Neighbourhood as an Islamic principal for community gathering

Islam sees the neighbourhood as a very valuable social issue that residents should care about while living in districts within cities and towns. Some planners and architects consider neighbourhoods only as a translation of urban design concepts proposed by Western Neo-Traditional designers. The Islamic law schools, especially Maliki in Madinah as stated by Hakim

Islam seeks the neighbourhood as a very valuable social issue that residents should care about while living in districts within cities and towns. Some planners and architects consider neighbourhoods only as a translation of urban design concepts proposed by Western Neo-Traditional designers. The Islamic law schools, especially Maliki in Madinah as stated by Hakim earlier in 1986, sets rights and responsibilities between neighbours and shows how they can reserve rights for everyone (Hakim 1986). Abdul-Lateef quotes about the neighbourhood or what was called 'Harah' in most Arabic cities. Moreover he states that the translation of Harah is 'quart', 'part', 'section' or 'ghetto', a district which was resided in by Jews (Rajab, Sadiq et al. 1990). He quotes in Egypt for example, many names used to indicate a neighbourhood such as 'Hettah', 'Geerah', 'E'tfah, and 'Zogag'. But Harah was the most common and typical notion that was widely used (Rajab, Sadiq et al. 1990). He shows various definitions for neighbourhood based upon many authors as follows:

- Egon Emset Bergel, Urban Society 1955, who says the basic group of individuals live in a neighbourhood in a local area
- Eben Sayidah 1877: a residential place where houses are attached to each other and characterised by low income class
- Abdul-Mone'm Shawqi 1977; a small geographical society or the basic social unit next to family with regard to size and relationships, with either primary or secondary relations based on society itself.

He then states that in the history of Egyptian neighbourhoods 'Harat' were such a basic unit of society, which were surrounded by walls and each area segregated from others with gates and guards who did not allow entry except for residents or visitors. He adds that such neighbourhoods were a socio-spatial concept and well known within their societies boundaries; the neighbours did not always know each other, but they considered that they were aggregated by neighbourhood and thus they should co-operate in all events; celebrations, sympathy, or fights. It is thought he intended to consider

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neighbourhood as the starting unit for the development of local society (Rajab, Sadiq et al. 1990).

In Egypt as in Sham, and Hijaz (the western region of Saudi includes Makkah, Jeddah, Yanbo', and Al-Madinah) there were neighbourhoods called 'Harat'. Moreover, the same political control was ruled by the neighbourhood's marshal or "O'mdah". However it seems that Hoash in Al-Madinah was the smallest unit of local society as it was smaller than the Harah. This is because the O'mdah in Al-Madinah took the role of the 'Ahwash', the plural of Hoash. Yet the Hoash seems to be the same size as a Zogag. This rule of O'mdah was to maintain Islamic law over residents for their rights and responsibilities with their neighbours.

Akbar12 argues that Islamic law categorizes the right to individual rights either for the person or family and public rights related to the community. He states that rights are not an objective but a tool for establishing advantage of equity between all. Moreover, he adds that prejudicial 'damage' is one issue that is considered in Islamic law control over the rights that might be caused by individuals if they use their rights injudiciously. He mentions that neighbourhood rights is one of the rights expected by all, and prejudices should be avoided to prevent problems between neighbours (Akbar 1995).

Koshak within the same proceeding illustrates individual's rights and duties, and also mentions neighbours rights (Koshak 1995). He states that the size of a neighbourhood is forty houses and relates this to the Hadith described by Ka'ab Eben Malik13, but this is not based on historical study of an Islamic city nor does it give any examples. He outlined a concept of eight neighbourhoods in each district, four on each side of the collective street or 'Qasabah'. Then he calculates the size of neighbourhoods with regard to population and a consideration of districts with a proposed size of generated family of 15 capita. He does not mention if the figure is based on a study or a theory. Moreover, he argues that neighbourhood boundaries should be regarded as non-physical as it is considered in Western concepts of neighbourhoods. Moreover, he states that a neighbour of a mosque is considered as a neighbour with regard to the Hadith but does not quote a reference or number. Such a Hadith was searched for by the author but no result was found in all Hadith search engines. Such figures should be based on

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13 Koshak, A. H. Ibid. Islamic Concept in Design Built Environment, p: 12-19
historical case study, and based on well known Hadith with a reference number of the Hadith and its rank.

The more considerable contribution in the neighbourhood as an Islamic principal is Shamsuddin,\textsuperscript{14} who illustrates the neighbourhood as a social principal that forms the urban form of Islamic communities. He regards Qur'anic verses and the Prophet's sayings 'Hadith' (Peace to be Upon Him) as evidence for neighbourhood meaning in language, law, before Islam a social duty to support others, and after Islam as a value that is confirmed, sustained and categorized. Moreover, he allocates priority of neighbourhood roles as general within Islamic law without exclusions. However his contribution is not based on maps and urban studies, as he mentioned in 'Islamic Urban society' (Shamsuddin 2004).

2.3.7 Concepts and conflicts of Urban Planning

Regarding the rapid growth in Muslim countries, fast and ready proposals, concepts, and ideas of urban planning were set for developing vacant lands and suburbs. First they were called 'Master Plans', which were mostly outcomes of the modern movement of planning. These were seen as models to satisfy society and able to solve present problems and forecast future needs. Such concepts still have more control mechanisms over development and community. Nevertheless, they are mostly very abstract to the public, or even to local practitioners. Thus, implementation was incorrect and foreigner professionals were not equipped to deal with local urban problems. Consequently, most of the richest Arab cities have western forms which conflict with local urban forms. Konash (1980) criticises western firms who practiced in Saudi and lacked knowledge of the local culture (Al-Naim 1998).

In the mid ninety's flexible methods of planning appeared in western countries but have not been applied in all Muslim countries. These are called 'Structural Plans'. A structural plan allows practitioners to interact with social and economic realities and needs, within a guidance framework of local planning and to benefit from participation of social groups. This remains at the national level of planning in some countries; it was never adopted in others because of the nature of central legislative forms of planning there. Therefore, Bianca argues that planning frameworks are mostly

imported, reflecting external coercion instead of local social aggregation. He states that:

\[This \text{ diminishes the scope for self-regulating processes, and the resulting gradual disintegration of traditional communities calls in turn for increased governmental control and restrictive building regulations. Regrettably, very few attempts are being made to adapt the planning instruments to the local customs prevailing in Muslim cities.}\](Bianca 2000), p: 198

In the case of Saudi Arabia, building regulations were adopted and implemented but policies have not been interacted with related strategies. They sometimes remain rigid regulations, as in Neighbourhood Plans without flexibility within local realities. Thus, showing these related plans, policies, and regulations within the various levels is important here. I will start from National level and go down to neighbourhood levels in both vacant land and informal areas.

### 2.4 Urban Planning Policies in Saudi Arabia

Eben Saleh shows the hierarchy of the planning system in Saudi Arabia at the national level as shown in Figure (2.1). Only the three shaded blocks deal with physical planning of neighbourhood design and approval. These sectors work within the general principals of the fifth development plans. In terms of urban planning, the hierarchy of physical planning and government agencies is different. At the national level, many governmental agencies co-ordinate with others in terms of general planning, but other agencies at local levels may not do the co-ordination. Prior to this it may be useful to show the hierarchy of guidance development plans for other lower hierarchies.

#### 2.4.1 National View: Ministry of Planning and Developments Plans

Most development plans are strategies and principals decided by a planning authority to control land-use and environmental change (Adams, 1994). In general, these plans aim for three main goals, which are encouragement of development (land-use zoning), preventing such land-uses (green-belts and parks), and directing investments (shopping, housing development). In Saudi Arabia, the Ministry of Planning prepares Development Plans for every five years according to the Arabic Calendar. The first was for 1390-1395 AH (1970-1975 AD). The recent one is the Seventh Development Plan, which is for (1420-1425 AH), which is between 1999 and 2004 AD.

Eben Saleh states that this was the shift in planning nature after a series of five-year development plans were initiated in the early 1970's (Eben-Saleh 2002). Development
plans should be a short-term framework for lower hierarchical departments such as local government, and other strongly related ministries and their branches, such as of the Ministry of Housing, and Ministry of Municipal and Rural Affairs. Physical infrastructures and social services are two of five sectoral planning departments under the Asst. Dep. Minister within the Ministry of Planning.

Broad statements and strategies are listed within the seventh development plan. In general goals, those most related to neighbourhood planning are:

- No. 7: Seeking to establish balanced growth, and increased contribution in national growth.
- No. 8: Increase the contribution of private sector in actions of social and economic developments.
- No. 9: Predisposition the national economy to deal in flexible efficient forms with the recent variables and changes of global economies.
- No. 13: Completion of primal infrastructures, which are essential for implementing and maintaining a comprehensive development, and upgrade its execution and methods of finance.
- No. 14: Concerning information sciences and technologies, and enhancing research, upgrades and localization of technology. (7th Development Plan, Ministry of planning)

Nevertheless, Strategic Recommendations are stated in more detail and give more guidance. The most relevant ones are: (of seventeen)

The second strategic principal: improve efficiency of productive services and amenities that are produced from government to citizens in a direct way, such as education, health, municipal and security services, and indirect way such as water, electricity, transportation, and primal goods in the following guides: (two of four)

- 1st, Limit the specifications and standards which are inflated in terms of structural, operational, and advisory and maintenance projects coupled with application of feasibility engineering, reduction of total costs, and project's fractionating.
- 2nd, Expand in using information technology efficiently in terms of working with the national economy in all aspects of public services.
The third strategic principal: continuing the policy of allowing the private sector to operate some of the social and economic orders, conditioned by real benefits such as reduction in costs, efficiency, and employment. This policy can be achieved by the following: (six of sixteen)

- 1\textsuperscript{st}, going on in implementation of privatisation policy, with orders to allocate the exact time and adjusting suitable conditions for nominated utilities for privatising to assure achievement of goals.
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- 2\textsuperscript{nd}, accelerate review of all related systems to private sector's activity in order to simplify procedures and remove difficulties.
- 4\textsuperscript{th}, facilitate procedures for establishment of more contributor companies.
- 8\textsuperscript{th}, provoke trade banks to increase their facilities for productive projects and increase the concern of small ones.
- 11\textsuperscript{th}, provoke establishment of local financial companies for local investments.
- 16\textsuperscript{th}, enhance private sector for efficient contribution in local development.

The fourth strategic principal: Concern of existing infrastructures to preserve them in operational condition that allows for optimum efficiency of use and decrease in costs. This would be by the following: (three of five)

- 1\textsuperscript{st}, giving the most importance to costs of maintenance and operation in designing projects and preparing their feasibility studies.
- 2\textsuperscript{nd}, seeking reduction in maintenance costs by using correct standards and measures whenever possible.
- 4\textsuperscript{th}, any project should include program maintenance and operation that would be essential in future, and its annual costs with respect to orders of minimizing requirements of maintenance as much as possible.

The sixth strategic principal: conducting direct subsidies, paid by government for some goods and services by the following:

- 1\textsuperscript{st}, allocating subsidies paid by government for goods and services and scheduling them for decrease and cancellation at the correct time, and replacing them with adequate pricing policies dealing with conditions of low income groups, and follow the required procedure to pay them to the group most in need.
- 2\textsuperscript{nd}, concentration in all governmental administrations should be given to economic standards as a formal strategy regarding three main principles: reduce total cost of these services to Saudi society; prices should not exceed their costs; and avoiding having any oligopoly, and creating a competition element as soon as possible.

The tenth strategic principal: increase the contribution of the public in terms of manpower in different economic sectors, especially those that do not conflict with Islamic principals. One of those strategic policies is:
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- 6th, increase the concerns with local society’s programs based on participation and contribution of the public in planning and implementation of projects.

The eleventh strategic principal: moving on the establishment of balanced developments between the Saudi Regions and increasing contribution in comprehensive development by satisfying the following:

- 1st, allocate growth centres as principal of regional development and enhance the investment within.
- 2nd, pursue regional multi-economics by optimum presumption of their budgets and available resources, in order to achieve integration.
- 3rd, enhance the role of municipal and regional councils in order to develop their counties.

The twelfth strategic principal: preserve the environment and develop it by achieving the following:

- 1st, developing systems of environmental preservation and its natural characteristics and limiting the desert ring.
- 3rd, continuing to achieve a steady balance between population distributions and the environment’s occupancy capacity regarding the effects of population growth and consumption upon natural resources.

The thirteenth strategic principal: taking account of a balanced financial strategy between the country’s revenues and size of expenditure through:

- 1st, accounting methods aimed at decreasing government expenditure and increasing its revenue, stressing increased operating efficiency of governmental firms; decreasing government expenditure in non development sectors; and developing non-petroleum revenues.
- 2nd, keeping policies aiming to stabilize inflation rates within minimum levels as far as possible.
- 3rd, develop investment and financing systems in development projects, which allow for efficient contribution from the private sector in this field.
- 4th, re-structure governmental firms including creating new ones and incorporating others.
- 5th, minimize budget shortfall and seek to decrease the size of public credit down to an internationally acceptable level.
The fourteenth strategic principal is for building a national base for science and technology through six issues. The most closely related one is the 5th, which is about preparation of a national plan that employs databases and other technology in supporting economic development. The fifteenth strategic principal: follows a residential policy regarding the population's quantitative and qualitative characteristics and their geographic distributions. Nevertheless, it enhances relationships between residential characteristics and economic growth through:

- 3rd, preparation of residential surveys to allocate their present and future needs. Survey for statistics of residential characteristics in cyclical form.
- 4th, implement a balance between population and development through all the Kingdom's regions.
- 5th, implement an increase in health and social services in regard to population increase.
- 6th, provide suitable tools in regard to facing needs of residential structure.
- 7th, spread technology in both services and utilities with suitable quantitative and qualitative methods.

The seventeenth strategic principal: concentration on maturity as a principal that supports economic and social development through:

- 3rd, spreading technology use for conservation of strategic economic resources and enhancing their efficiency.
- 4th, efficiently use capacities of services and utilities which are available in the Kingdom's regions.
- 5th, spreading of set standards, measures, and technical norms for the use of economic resources in optimum efficiency.

The contrast in divided cities has been noticed globally. In all regions of the world disparity of districts between wealthy business districts, neighbourhoods and slums, is very clear in most developing countries. Nevertheless, these shadowy neighbourhoods and tumbledown quarters occur in various countries. Thus, there is an invisible buffer that shows this division within cities. International investment may be attracted to such wealthy districts but never looks at adjacent traditional neighbourhoods or slums. These areas are considered by capitalists to be suitable for demolition and replacement by new huge developments. Moreover, local investment may do the same and in Al-
Madinah plenty of examples exist. Before showing these examples, it may be useful to have a look at the legislative process of urban planning within the Ministry of Municipal Affairs and then in Amanat Al-Al-Madinah Al-Monawarah (Municipality of Al-Madinah).

2.4.2 Master Plan

In Saudi Arabia for example, Riyadh had its Master Plan in 1970 by Doxiadis (Daghistani, 1985). Other cities like Mecca, Al-Madinah, Jeddah, Taif, and Yanbu then had their 'Master Action Plans' with a scale of (1:1,000 and 1:2,500). They were actual implementation control policies and restrictive building regulations as stated by Roberts (1979). In the case of Al-Madinah, Kaki (1998) illustrates in very detailed form the main planning studies prepared for Al-Madinah. In short they are as follows:

1- Guidance Plan Studies by Consult Limited, 1972 included: updating plans of the Egyptian Survey; urban studies for main streets; provision of services, utilities, and open spaces for the Prophet's Mosque; and the first aerial photo survey for Al-Madinah in 1964

2- Master plan 1973, by 'Robert Mathew, Johnson Marshal and Partners, Consultants'. It was the first stage of planning studies prepared for Al-Madinah and included principals and components of the General Plan of the Western Region Planning Project. It was mainly concerned with strategies of land use, growth direction, and economic activities for Al-Madinah.


In general, its concerns were about setting guidelines, outlines of comprehensive development control policy, and scheduling processes of plans implemented within a range of 15 years. But detailed studies were about economic activities growth after the war of 1973 (Arab and Israel), population growth and housing needs, investment and public expenditure, especially urban projects after economic growth, land subdivision projects and erosion of farm lands, construction and over proposed density, and conflicts between the 1973 plan's proposals and present urban land uses.

4- Comprehensive Consultant Studies of Detailed Plan for Al-Madinah 1994, by 'Dar Al-Handasah for Design and Technical Consultants'.

Its main aims are: Al-Madinah's development until 2010, Islamic values reservation, manpower upgrading, continuation of privatization, enhanced cultural and information movements in terms of development, and obtaining huge visitor and pilgrim numbers in
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terms of services and utilities. Its studies are in the following topics: urban structure, administrational divisions (municipalities service areas), urban structure characteristics, land use, housing, commercial activities, public services, agricultural activities, vacant land, building conditions, building heights, building materials, building ages, development and population growth, population densities, general characteristics of Al-Madinah's economic structure, income and expenditure, educational services, health services, social services, municipal services (cemeteries and public parks), and infrastructure utilities (water, swage, sanitation, electric and telephone). More detailed data about the plan's issues, goals, considerations and principals will be in the next chapter.

2.4.3 Structural Plan

Regarding the results of planning studies of urban development between 1965 and 1985 AD, Dep. Ministry of Municipal Affairs for City Planning noticed the necessity of a structural plan. It was compulsory because of the following reasons: gaps between urban growth and provision of infrastructure facilities and utilities; social and economic conditions within urban growth; inequity within regions and necessity of regional planning; urban growth was too rapid for the preparation of effective plans; a transformation period of minimized development and controlled urban growth with vast unbalanced urban growth and infrastructure provision especially in eastern and western regions (where Al-Madinah is located).

Thus, urban planning activities concentrated on adjustments for organised urban growth. The aims were to reach for efficient use of existing infrastructure networks, and to determine random urban expansion of cities. Thus, the Dept. Ministry for City Planning prepared adjustments in timed stages of urban expansion for the city's expansion. This adjustment is called the 'Urban Spectrum', which is a boundary for urban growth until 2003 for all Saudi Cities. But, it was not always respected as a framework. In Al-Madinah, a new neighbourhood plan was approved last year and the selling of plots started last year. This plan is located out of the 3rd Ring Road, which should be its urban spectrum until 2003.

The Structure Plan is not a plan but basically a technical guidance document. It illustrates land-use policies within a region or sub-region. Moreover, it sets controls and development proposals for the urban environment. It might be considered a general
framework that allocates action areas detailed within local plans. Thus, Al-Mokharrij\textsuperscript{15} states that structural plans for Al-Madinah and its surrounding villages may allocate future growth direction, land-uses, and road networks within an integrated form as the whole of one region and based on principals of the Regional Plan. (Al-Madinah Municipality, 1995, ‘Al-Amanah’no:10, p: 23)

### 2.4.4 Functions of Structure plan

Its functions are:

- Concentrates on excretion and calibration of urban problems related to land-uses within the region according to physical distribution, location and quantity needed for development land.
- Proposes solutions, prepares related detailed studies in terms of housing, allocation of growth centres, physical allocation of social services centres, improving networks of roads, infrastructure and communication, elements of urban structure and environmental conservation.
- Set policies of land-use and essential adjustments to direct urban development on both regional and local levels in flexible form.

It is considered as the executive framework for the National Comprehensive Plan. It consists of technical reports, key maps, and an illustrative report. Most of the structure plan’s issues are related to urban planning as follows:

- Human settlements; their geographical distribution and expansion.
- Housing and allocation of their required land.
- Transportation and communication networks, improvement and increased traffic efficiency.
- Social services (education, health care, religion and cultural aspects)
- Environmental conservation.

The principals of the structure plan concentrate on the development poles. Thus, the urban national strategy allocated many development principals after analytic studies for most social and economic characteristics of the human settlements within all Saudi’s urban and rural centres. These principals were set according to the National Development Plan and the different administrative boundaries with their local characteristics as a primary framework for data collection and analysis.

\textsuperscript{15} He was Mayor’s secretary of technical affairs and projects in Al-Madinah Municipality 1990-1998
2.4.5 Local Plan

The local plan is an essential detailed framework for interpretation of development policies within the structure plan, development proposals, urban controls and principals of coordination of development projects. The function of a local plan can be summarized in four basic tasks. First, improve and implement policies of structure plans and general recommendations of urban direction within detailed level and in allocated action areas. Second, set a detailed framework for implementation of urban development controls. Third, coordinate development proposals and specific recommendations for all aspects of land-uses in both public and private sectors. Fourth, indicate planning issues and urgent problems in detailed form for participation in decision-making and set adequate proposals. Local plans have three levels, they are:

- District, local and general plans such as the Prophet Mosque and Central Area Plan.
- Action area plans such as neighbourhood and informal area plans, which are the area of this research.
- Subject plans such as natural resources and environmental conservation plans.

2.5 Theory and Process of Neighbourhood Urban Planning

Eben Saleh states that (Al-Mubarak 1995, and Al-Hathloul 1996) claim the first neighbourhood schemes were launched in the mid 1950’s. They were for employees of the government, and the Arabian American Oil Company (ARAMCO). Eben Saleh mentions that neighbourhoods were designed within peripheral roads and were subdivided to sub-neighbourhoods by the next category of roads that led to blocks of services and facilities (Eben-Saleh 2001). He then states that the newspapers showed conflicting views of the public and the government as the public were not involved in the process of neighbourhood planning and decisions for the design concept.

Planning goals and policies for neighbourhood planning and land subdivision are ideals. The publication\textsuperscript{16} that the author received when he was a planner in Amanat Al-Madinah (Municipality) and was responsible for reviewing the alternatives and plan of subdivision approved in 1992-1994, shows the following:

\textsuperscript{16} MOMRA, M. o. M. A. (1994). Goals and design policies and most important planning measures for preparation of residential land subdivision 'Arabic'. Riyadh.
General goals:
- Provide adequate urban environment with both comfort and security for residents to provide
- Minimize costs of infrastructure's construction and maintenance
- Integration between the applied plan, surrounding plans, and city plan

Design policies:
- Plans should be integrated with surrounding roads and districts in terms of pattern of design and services distribution
- Residents should feel involved in and responsible to a neighbourhood
- Land-use distribution should satisfy the maximum rank of privacy within the neighbourhood and residential unit
- Pedestrian movement should be enhanced within the district with safe and attractive areas
- Traffic pass-through should be restricted from divided residential plans
- Residents should be divided into small clusters
- Street length should be minimized
- Cars should reach the maximum number of residential units
- Subdivision plans should be adequate for topography and natural and physical content
- Services should be provided with a land-use plan and according to services within adjacent districts
- Adequate car parking places should be provided
- Local urban heritage should be considered during the design of a residential district
- Sub-division plans should have various sizes of plots relating to the various social and economic groups

2.5.1 Planning Standards

In terms of neighbourhood planning, Eben Saleh (Eben-Saleh 1998) states that:

>'the exercise for architect, urban designer, and planner in this process is not to produce an "open museum" but to preserve the integrity and values of community itself, creating buildings those comply with modern standards'.

But he should add 'with actual local ones' to fit his principal of 'new vernacularism' (Eben-Saleh 2001). Nevertheless, the Dept. Ministry of Municipal Affairs for Cities
Planning (DMMACP) and two local consultants in Riyadh city set these measures and standards:

- Children’s play areas should be provided with a minimum of 400 m² per each 20 residential units without passing any local collective street.
- About 6.5 m² per capita of public parks should be provided with a minimum area of 5000 m² in adequate topography for playgrounds. Residents should not have to pass a main street to access it.
- Area (of roads and parks + open spaces + walkways + children playgrounds + public parks) should not exceed 33% of plan’s total area.
- One local mosque should be provided for each residential cluster within a maximum walking distance of 250 metres and Friday’s mosque within the district level within a maximum walking distance of 800 metres.
- Schools: primary schools should be provided within a maximum walking distance of 550 metres, and intermediate schools should be provided within a maximum of 800 metres.
- A local service centre should be provided within an area of 10000 m² for the first 200,000 capita, plus 150 m² per each extra 1000 capita. It should contain health care, police station, post office, municipality branch, and fire station.
- A social centre should be provided within the district level within an area of 2000 m² plus 0.13 m² per capita.
- Plot sizes: it is stated in planning regulations that plot size should not be less than 400 m².

2.5.2 Modern models for neighbourhood design concepts

In 1994 a study prepared by An-Naim Consultant Office in Riyadh during a committee of urban planning managers, proposed two alternatives as models for Riyadh neighbourhood plans. Both have clear separation between pedestrian and car movements, two main accesses to plots (one for a car and another walkway to mosque, park, school, and services), but they differ in the number of clusters and form of surrounding layouts. Scheme 1 has four radial spines as mixed zone areas (high-rise
residential and commercial areas) which reach the sub-centres of the four neighbourhoods. Scheme 2 gathers six or more clusters on one main street of mixed car and pedestrian traffic that leads to a district centre, which includes a mosque, schools, parks, and markets. Figure (2.3) and (2.4) show these clearly. Housing clusters are grouped for 10–15 plots around a children's play area from backyards which is similar to traditional patterns of hush. Front access is for cars.

Figure 2.3: Districts, neighbourhoods and cluster of dwellings as proposed by Al-Naim Consultant in the Urban Planning Managers' meeting in Riyadh 1994.

Main centre for district is between the four main inner collector roads. Each neighbourhood has its own mosque, primary school, and small shopping centre. The district is surrounded by main roads. Open spaces appear as small fragments connected with pathways but their areas are not enough for all activities. Complete segregation between pedestrian and car movements.

Source: Eben Saleh 2002 (fig no: 15), and edited by author

These concepts of neighbourhoods aim to give priority to safety and comfort for the pedestrian rather than vehicular traffic; provide physical interaction between residents and their activities and their physical environment, and then integrate them within the neighbourhood; to provide family privacy and recognize separate private/socialization spaces for women in the special organization of the community; to decrease lengths of

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18 Author was participant as he was Planner in Amanat Al-Madinah ‘Municipality’ with Urban Planning Manager Eng. Mohammed Al-Ali
roads and consequently lengths of infrastructure networks; to enhance social relations between neighbours regarding private and semi-privates spaces proposed, such as play areas.

The new planning concepts at that time were agreed to be adopted as models in the process of neighbourhood planning by MOMRA with a few editions in terms of size of plots and their front length (Eben-Saleh 2001). This reflects the aims of the Ministry at that time to transform neighbourhood planning in such models with new patterns dealing with traditions and economic and social characteristics of Saudi society in Riyadh. Eben Saleh considers the strength of both models is in the segregation of inhabitants’ circulation from strangers’ one, and both these connect between open spaces (Eben-Saleh 2001).

In general, both alternatives were over sized neighbourhoods. In the first, each neighbourhood has over 300 dwellings. In the second, it is over 400 dwellings. Moreover, open space called 'Barahah' was surrounded by cul-de-sac circulation as a play area for clusters of 13 dwellings. It is safer in the first model, where the play area is fully segregated from car circulation and integrated between open spaces, walkways, and surrounding dwellings. The scale seems incorrect for play areas as open spaces appear very small to occupy a playground or play area. Each open space is full of trees. However, in the second pedestrian paths and surrounding green areas are allocated in the middle of proposed neighbourhoods with primary schools, mosques, and nurseries. Dwellings are in streets far from such facilities, and more green areas are allocated as semi public areas for over 400 dwellings. This is a huge number to have a shared open space.

Subdivision in the second scheme does not differ from contemporary schemes. It originally starts with zoning and then subdivision for dwellings and services. This is the case in governmental or professional housing projects, but for normal landowners who only want to subdivide and sell plots the story will be totally different. Landowner interests as stated by (Abdulaal 1987) lie in maximum saleable plots, yet no more than the normal ration of services will be available. Only 33% will be left for roads and services. Serviced lands allocated for schools and health centres or mosques will be held by the landowner until he is paid, yet such areas are mostly vacant for a long time until the majority of the plan is developed, then services will be provided.
Chapter Two: Literature review: Urban Planning and Neighbourhood Subdivision

Figure 2.4: One district zoning plan with four neighbourhoods ‘Scheme2’
Each neighbourhood has its own service spine mixed with open space considered as semi-public as it is open to streets. Source: Eben Saleh 2002 (fig no: 16) and edited by author

However, landowners do not intend to leave open spaces as parks or play areas but will ask a consultant officer to allocate land use categories in order to obtain a better land price later. On the other hand, in the second scheme, plots will have the same building regulations for setback and so will waste land around the building, fragmentation of space will continue. Moreover, the four radial commercial and service spines are also over-estimated as shown in Figure (2.4). Over-estimation for necessary areas is the main cause of wasteful measurements and fragmentation of space. Islam prohibits waste in every aspect of life, in both Quran and Sunna orders are set by God, ‘Allah’, and Prophet Mohammed to avoid waste. Even in traditional customs ‘Urf’ and attitudes it is considered bad to be wasteful. It appears to be something most people agree on yet Franklin warns of the consequences of expense saying:

*Beware of little expenses. A small leak will sink a great ship.*
Benjamin Franklin (Brainy Media 2001)

In general both schemes have over estimated the size of neighbourhood units and mostly regarded what has been stated in Western models as based on the primary school. At the same time, neither are based on mosque distance as stated by (Koshak 1995).

With regard to size of neighbourhood, three clusters of the first model should be a single neighbourhood. This means that the proposed neighbourhood model in scheme 1
is about eight times bigger than it should be. Moreover, the geometric subdivision and copying of the same cluster provides monotony of plan, and does not give a good impression about plot values as developers look for. Unfortunately, this proposal was promised to be approved, then ignored or hidden within some municipalities who continued with old policies and regulations. Nevertheless, none were applied in private plans or governmental schemes but housing of Foreign Affairs in Riyadh has the same concept and this was implemented fifteen years before that model was presented. Eben Saleh (2002) states that the model plans 'as seen' will be applied in the future, which means that old processes, regulations, and measures are still applicable. Such measures lead to schisms or fragmentation within the community. Nonetheless, Eben Saleh argues the as same as Duany, Calthorpe, and Solomon in providing new codes during two decades of new urbanism for design of public and semi-private open spaces, and segregation between automobile traffic and pedestrian movement. All the Traditional Neighbourhood Development (TND), Neo Traditional Urban Paradigm (NTUP), and Transitional-Oriented Development (TOD) have the same concepts. He argues that the core principal of new urbanism is to reconfigure contemporary neighbourhoods (Eben-Saleh 2004).

Eben Saleh\textsuperscript{19} calls for a new conceptual notion which is 'New Vernacularism'. It is a concept based on cultural and religious issues in terms of urban design of neighbourhoods. He argues that provision for both social relations and privacy in both categories of semi and private open spaces should be stressed, but not as the western public bias. Later he starts to generalise his argument saying that:

\begin{quote}
'Since 1992, most of the newly designed neighbourhoods in the Kingdom are within the New Vernacularism concept..' (Eben-Saleh 2004), p: 634
\end{quote}

Such a statement is not valid all over the Kingdom of Saudi Arabia, where examples of new plans in Al-Madinah have been approved by MOMRA after 1992 and are still on the same type of land fragmentation subdivision, as will be shown in later chapters. It may be suitable for most parts of Saudi but not everywhere, and Al-Madinah is surely excluded from such a statement. However his example of the plan for Horaidhah subdivision shows partial implementation of Islamic and Saudi culture as only pedestrian paths were added between dwellings. Open spaces are left between every 10

\textsuperscript{19} Professor Dean of College of Architecture and Planning in KSU, Riyadh, attend conference in Bahrain 2004, which author presented his paper and Eben Saleh asked about the size of Block 'neighbourhoods' and Hoash. He asked some references related to paper and author sent them after he back to UK.
dwellings. Other schools and services are to be within the main pedestrian path between blocks as shown in Figure (2.5). In the former example the block seems very small to be a neighbourhood; the neighbourhood as a whole is very large for the size of an Islamic neighbourhood. He should be very specific in locality as he generalizes in his conclusion (Eben-Saleh 2001) but such a plan illustrates the real challenge in terms of vernacular urbanism based upon locality of each city or sub-region.

Figure 2.5: Block from plan of Al-Khairiyah Project in A-Horaidhah

It shows each 10 dwellings share an open space and are integrated with other blocks with pedestrian paths to services, automobile traffic is restricted by using cul-de-sacs. Source: (Eben-Saleh 2004), the main concept was designed by Al-Shuaibi Consultant for Al-Hamra scheme (1995) as stated in (Eben-Saleh 2001)

2.5.3 Process of local planning and vacant land subdivision

In terms of planning vacant land and developing it as residential neighbourhoods, the Dept. Ministry of Municipal Affairs for Cities Planning (DMMACP) set very long and complicated procedural processes for neighbourhood plans. These procedures are summarized regarding neighbourhood planning within cities as follows:

1- Location study: allocation of the plan location within the urban spectrum of cities and both governmental and private land, and within the city’s structural plan. If it is outside the spectrum, then it would not be allowed according to the decision of Ministers County, 18-9-1409 H, No: 175 task 2 Issue 2, which aims to stop development and planning of vacant land outside the city’s spectrum. If it is inside the spectrum then the use should be studied according to its adequacy for such residential development. If it is agreed by the department of urban planning regarding agreement from the mayor for such use, then it would be passed to the
department of survey to check the accuracy of the location and its title deed by coordination with a law court. Land should not have a farming use in the title deed, if it does, then an agreement from both the mayor and the Ministry of Agriculture is required.

2- **Primary agreement** is essential for a first draft plan to be passed through hierarchical routines within the Municipality starting from the planner. Then the plan is ready to be approved by the local Municipality’s mayor. First it should go to the Saudi United Electric Company for allocation of electricity lines, transformers, and stations on the plan. These transformers and lines would be related with the conformation of the subdivision plan. The applicability of the plan to the site is checked, to ensure that there will be no liabilities later during on-site confirmation process.

3- When this is completed, both the draughtsman and planner dealing with the application sign the plan to approve the process. Two copies are required to be signed by the following: surveyor, department of survey’s manager, department of city planning’s manager, then urban planning general manager, the mayor’s agent, and finally by the mayor to be sent to DMMACP in Riyadh to get approval. If this is not approved, then modifications and editing to satisfy DMMACP’s recommendations and notes must occur. Modification should be done by the applicant’s consultant and again follow the cycle of agreement until it is approved by DMMACP in Riyadh.

4- **Final approval and implementation of the plan:** after the plan is approved by DMMACP then final approval will be taken again but ten copies are required to be signed with the same sequence within the municipality. One copy for each of the following: DMMACP, Dept. of Survey, Dept. of Urban Planning, law court, United Electric Company, Water and Sanitation Intendancy, Saudi Telecom, and the landlord. Three copies and the base-map should be kept in the municipality’s archive.

2.5.4 **Fragmentation of roles for land subdivision**

Land subdivision mostly operates in the interest of the developer or landowner as (Abdulaal 1987)\(^{20}\) argues that the main role is for the landlord or developer rather than

the municipality, and not the residents who will buy and live in this space and place for the rest of their lives. Yet he states that large vacant areas are not allowed to be developed until the owner subdivides it to be sold later. His three main approaches are: contextual factors affecting supply patterns and subdivision; land tenure and land-uses and the consequences after the subdivision process. Abdulaal argues that fragmentation occurs between agencies and authorities who are responsible for provision of infrastructure. He states that fragmentation of responsibility occurs at a local level too where each authority works independently from others but relates to the ministry or central agency and is controlled by budget approval.

In contrast, even old regulations are not known by the planners in Al-Madinah Municipality. For example, Attass said that there is no approved document that states such regulations and policies, but we know from previous expert planners and architects within the department, or the general manager for example, that a loop as a pattern of roads within a neighbourhood plan is proposed by DMMACP! ‘I personally didn’t receive such a generalization’ said Attass21.

"There are no stable standards regulations for neighbourhood’s planning from the Ministry of the Municipal Affairs" (Attass 2001)

He did not see what had been publicised in 1994 due to poor archiving and illiteracy in some urban planning authorities. Moreover, this might be caused by a lack of technology such as computerised archives for such policies and regulations. Meanwhile Attass was the first planner who brought his personal PC to his office at Al-Madinah Municipality in 1998, previously all other members did not have governmental PC’s at their desk.

2.6 Redevelopment policy of Informal Areas

Throughout the developing world, informal areas have spread and been structured around old cities between the 1970’s and early 1980’s. This did not happen where regulations controlled the avoidance of new expansion of such areas. Eben Saleh (1998) states that:

‘As these cities have grown over the centuries, the old core has become surrounded by new formal and informal urban developments which differ drastically from traditional town planning and design’.

21Planner Husain Attass was the manager of Department of Local Planning in Amanat Al-Madinah ‘Municipality’. He gave his comments to researcher in interview held in 2001.
Nevertheless, these areas required essential services and utilities, and consequently, roads and infrastructures. Kasarda and Parnell (Kasarda and Parnell, 1993), define this form of housing as 'illegal land occupation' from low income groups on the most accessible lands with uncertain tenure. Construction is basically self-financed and built with traditional local materials in a very short period of time. Such dwellings take only a weekend to finish primary construction while government and planning authorities are closed (UNCHS 1982). In most Asian countries this form of construction is common with different types of materials and sizes relating to social and economic realities. It may also reflect the actual requirements of their needs. Policies for stopping this occupation of land are not always effective and thus, related planning agencies deal with them by enabling strategies.

As-Sinany Mosleh summarized seven reasons for these land occupations as follows:

1. The need of some households to construct a house in short time and at low cost
2. Households granted land to reside in traditional areas where most services are available while their grant-land has none.
3. To be near their relatives and social groups
4. A man with many wives may prefer separation of each in her own house
5. The need for capturing lands and gaining wealth from future development
6. Uncertain tenure of plots and vacant land between traditional areas
7. The first to capture it will own it

Then he states what difficulties occur when facing the implementation of removing illegal occupants because of fear, disturbance, photographing process, closing access to sites, threats to use power or fire, solid doors, women and children and possible casualties, and plenty of claims to the Mayor, Prince, and King in some cases.

2.7 Squatter Upgrading or Re-planning

Similar to site and service schemes, which include subdivision of vacant land and provision of basic services for actual needs which are upgradeable in future, squatters of informal areas are involved in schemes of upgrading and improvement. These improvements include infrastructure provision such as water, electricity, sanitation, waste removal, and roads as in Calcutta (UNIESA 1986b), which happened through

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Calcutta Metropolitan Development Authority (CMDA) and the International Development Association. Another example is Jakarta's Kampong Improvement Program (KIP), which was a success in enabling as many residents as possible to have access to basic services with living standards. The estimated population to benefit from this project was approximately 3.8 million capita (1989a). In another case such as in Al-Madinah's informal areas, the telephone was an extra service provided for informal squatters.

In Al-Madinah, Al-Madinah’s Mayor Abdul-Aziz Al-Hussayin mentioned that redevelopment plans had been prepared for sixteen squatters and informal areas in Al-Madinah rather than service provision, but re-subdivision of vacant lands to plots of a minimum area of 400 m², and others would be refurbished or demolished completely²³. Later²⁴, it is mentioned that about twenty one informal areas with a total area of 38 KM², already have their upgrading plans. Al-Mujahideen district is one of them, which lacks some municipal services such as road asphalting and lighting as seen below:

Nevertheless, Al-Hussayin, M., Al-Khodhairy, Al-Shu’aiby, Osamah, and Al-Shaybani, in a seminar about 'Informal Building Threatens Urban Identity', state that these informal buildings are one of the main causes for urban problems and loss of urban identity in Saudi cities²⁵. Thus, Al-Al-Madinah Home Office studied and prepared strategic reports for those informal areas. Al-Khidhir, Al-Anabiss, Al-Ejabah, and Ad-Dowaimah are examples. The redevelopment of informal squatter areas was one of the issues discussed in the Higher Planning Committee of Al-Madinah in 1995. Prince Abdul-Majeed Al Saud was president and Mayor Al-Hussayin and Minister Assistant Al-Hathloul were members. At the committee studies for the redevelopment of squatter areas were agreed and approved for the following areas: south Ohod Mountain, Aj-Jorf, Abar Ali, Ad-Dowaikhlah, and An-Nasor districts. Examples of those areas are shown in pictures below.

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²⁵ Okaz News paper, No: 10115, 1994
Nevertheless permission in some informal areas was stopped, where they would normally be granted, because their land would be needed in new projects\(^\text{26}\). This replanning process is no more than coloring and reducing densities in informal areas or an ‘increase in measures of plots within the district’, and making direct and wide roads for vehicles. The Home Office team recommends easy access to the districts to ease their task of investigating and checking for illegal residents. Yet it is essential to know the related governmental bodies, infrastructure agencies, service firms, and private development sector are dealing with planning, either directly or indirectly.

\(^{26}\text{Al-Madinah Municipality, 1999, 'Al-Amanah' no:18, p: 27}\)
Figure 2.7: Informal area lacks asphalting, green areas, play grounds, and lighting

It shows re-planning process left a pattern of main roads, but it is only subdivision after blocking a group of buildings, vacant lands left for services, and rarely intended to have open spaces between plots. Yet, it is only fragmentation not re-planning.


2.8 Related Authorities, Agencies, and Organisations and co-operations

In the case of neighbourhood planning the hierarchy of government agencies in terms of neighbourhood planning is clear in the routine matters, but co-operation in between is not, as shown before during the process of planning approval. When Dr. Karbooji (the general manager of the Health Executive) was asked about coordination with the Municipality in terms of plans and allocation of health centres he said:

‘We haven’t reached yet this stage of modernisation’,

Nevertheless, As-Seraihy\(^{27}\) stated that at the present there is no cooperation between Municipality and Education Directory in terms of neighbourhood planning and allocation of schools within. Thus, all of the following agencies and organisations should coordinate in technical issues and each one produce its own recommendations for participation of the public which is a key issue in the planning process: The Ministry of Municipal and Rural Affairs/Deputy of Ministry for Municipal and Town Planning; Department of Urban Planning within DMMACP, within Al-Madinah

\(^{27}\) the Engineer who is responsible for new school construction or rental contracts in the Education Directory
Municipality departments of; survey, city planning, land tenure, urban planning, Mayor's office, naming and numbering; the Ministry of Agriculture; Electricity United Company; Saudi Tele-Communication Company; Ministry of Water and Sanitary; Consultant Offices; Education Directory; Health Executive; Social Services Agency; REDF; Ministry of Transportation; Branch of Housing Ministry; Home Office; and Internal Security should share data resources and participate in the decision-making process to save their efforts and time to adjust the appropriate policies to fit society's needs effectively. Thus, as Eben Saleh states (2002):

'The integration of organizations should reflect the concepts of diversity and unity. Unity also means an increase in the co-ordination level between the organizations, particularly during the decision-making process'.

It is not only the multi-planning cooperation agency model which is the ideal solution for neighbourhood planning, but the decision making process should start from the bottom up. Unlike the meeting of urban planning managers in 1994, where those managers and high status members of society decided what the public needed and should live in, this was widely applied in the past in Saudi Arabia and should not continue. Such organisations and authorities may be involved in the development of the planning process at national level, but recommendations and studies should be sorted from local authorities and agencies with regard to their local characteristics. Thus, it is very urgent that every authority deals with its own professional consultations and responsibilities to adjust policies that fit compatibly with its local realities. The cooperation process is important to guide all planning decisions and policies of all local planning agencies to gain satisfactory principals from all governmental agencies, the private sector and the public.

Thus, to monitor cooperation between all related agencies, the Deputy of the Ministry for Municipal and Town Planning, Department of Urban planning within DMMACP, which is the central legislating authority responsible for Saudi Arabia's overall urban planning issues, can act as a strategic planning agency at the national level. On the other hand, the Department of Urban Planning in each city can act as local coordinator between local planning agencies. DMMACP's role would then be to set a general flexible framework that these agencies should act within and relate to their localities to
correct and modify their adjusting standards and measures after revision of the general guidelines. Then, achievement would be, as Eben Saleh says:

‘Privileges are given to the agencies allowing them to suggest modifications and adjustments to the framework's outline; in case the outline cannot be implemented or if changing conditions warrant an adjustment’.

2.9 Conclusion

Saudi Arabia is one of the countries that have been highly influenced by foreign experts in terms of urban planning systems, and the built environment that forms the urban patterns of the country’s cities. These patterns have shifted far from its traditional ones. During the last few decades, Saudi Arabia witnessed the rapid expansion of large cities and towns. Most early planners and architects were foreign experts, and sometimes local ones with imported ideas and theories created to suit the developed world and cities. While local authorities deal with expected and non expected expansion, informal areas grew around urban centres and between new planned districts. The urban pattern became very scattered and fragmented, and this was echoed in the efforts of planning.

New urban projects in most cases discounted the socio-cultural context of cities with a traditional urban environment during the processes of design and planning. The cities’ local traditional urban forms then changed. Some concepts, like the widespread neotraditional neighbourhood development, appeared in Saudi but they were very limited in number and large in conception with regard to the size of the neighbourhood.

Al-Madinah was a remarkable case in rapid changes in the urban pattern. While the old city was demolished completely, planners have had no choice but to deal with either new planned areas or informal areas and sometimes a combination of both. Thus, questions arise about the achievement of current urban planning in Al-Madinah. Neither in informal areas, which were of a low quality, nor in new areas, which lacked services and had high standards and construction costs are satisfied residents. This will be investigated further in the next three chapters. Moreover, in upgrading the informal squat areas, vacant and demolished areas are re-subdivided to lots of a minimum area of 400 m², which adheres to the old plan’s regulations.

The centralized planning system and processes have been modernised at a slower rate than the rate of development and physical growth. Decisions have been generalised in
the last three decades, but all economic and social conditions have changed and are not suitable for current conditions. Of course, the current climate is very different to the 1970s when huge amount of revenues were gained from oil. Even when the 7th National Development Plan recognised these changes in economic considerations, local authorities still implant their previous policies, regulations, standards, and measures.

In modern planning, neighbourhood planning approaches are likely to be a consequence of many integrated processes and cooperative efforts. Planners should not view a particular proposal as the ideal one or a model for all cities and societies. Planning should be a combination of many principals to seek exact objectives. Thus, in implementation of such a model as shown before, planners should recognise that the Saudi's contemporary planning system will not be unified in all regions and cities. But thorough studies in society should be obtained before planning and the upward direction of decision making should be adopted in the planning process, especially in those responding to public needs and rights, which will possibly help the country to overcome many of its future development and urban challenges.

Most recently, applied planning regulations have been proposed by higher governmental, consultants, committees or commissions: these are of higher status in society and even when such policies and regulations are discussed for decision making, the public's views are ignored where decisions are referred for central approval from the Ministry of Municipal Affairs. Thus, planning regulations and policies are centralized in the Saudi planning system. Such urban planning policies and standards should not be generalised. Local authorities should undertake this role with their own local expertise and consultants cooperating with related local agencies and organisations, the public, and with regard to their local socio-economic characteristics, which reflects their appropriate quantitative and qualitative measures. The next chapter will explore traditional neighbourhoods 'Ahwash' in Al-Madinah as a unique local form between Saudi and other Islamic cities.
Chapter Three: Al-Madinah as a case study for defragmentation of urban space

"I have been ordered by God to a town that eats towns. They call it 'Yathrib', but it is Al-Madina...."

Prophet Mohammed
Chapter Three: Al-Madinah as a case study for defragmentation of urban space

3.1 Introduction

Al-Madinah was an oasis for traders travelling between Yemen and El-Sham (Syria). Many fragmentary settlements were dispersed around the travel route as Al-Harrbi shows. It has been called 'Al-Madinah Al-Monawarah' since the Prophet Mohammed visited the place. Al-Madinah means 'the city' and Al-Monawarah means 'illuminated', together, meaning 'the illuminated city'. Historically, Al-Madinah had many names, the most famous are:

3.1.1 Yathrib was its name fourteen centuries ago. Prophet Mohammed 'peace to be upon him' (PBH) changed the name and directed the Muslims to call it 'Al-Madinah' when Islam was established. In Musnad Ahmed, the Prophet said: 'He who calls Al-Madinah Yathrib should ask Allah, the Almighty, for forgiveness'. Thus, it is not called this any more.

3.1.2 Al-Madinah is translated as the word 'city'. It is the name by which it became famous after it was made the capital of the Islamic Nation. It is mentioned in the Qur'an and in Hadith many times. Allah, the Most High said, in Surat 9 Al-Taubah, Verse 120: "It was not becoming of the people of Al-Madinah and the Bedouins of the neighbourhood to remain behind Allah's Messenger". The Prophet (PBH) said: "O Lord, Make Al-Madinah beloved to us, as we love Makkah or of a stronger love". The common name was recently approved, rather than other similar names such as Medina, Al-Madinah, Al-Medinah, or Madinah as Al-Oafi. The technical manager of electronic government of Al-Madinah stated in an interview that ‘Al-Madinah’ will be the official name. Our website will be http://www.almadinah.gov.sa/.

Many other newly published websites such as the following include the name ‘Al-Madinah’:

- http://www.amanataltmadinah.gov.sa/ (website of 'amanat': Municipality)
- http://www.al-madinah.org/ (website of Al-Madinah Al-Monawarah Research and Studies Centre)

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Chapter Three: Al-Madinah as a case study for defragmentation of urban space

3.1.3 Taibah means pleasantness or goodness. The Prophet said in Sahih Muslim as narrated by Fatima bint Qais, when He (PBH) remembered Al-Madinah: ‘This is Taibah, this is Taibah, and this is Taibah’.

3.1.4 Ad-Dar Wal Eman (the Home and the Faith) are both mentioned in the Qur’an.

Other names and descriptions of Al-Madinah based on weak Hadith or traditional stories are:

Al-Miskeenah (the humble), Al-Mahboobah (the beloved), Daar Al-Abraar (abode of the justified), Daar Al-Hijrah (centre of emigration), Daar As-Salaam (abode of peace), Daar Al-Fa’th (centre of conquest), Al-Mukhtaaarah (the preferred), Al-Salihah (the excellent), Al-Monawwarah (the illuminated), Daar Al-Mustafa (abode of the chosen), Qariyah Al-Ansaar (village of the supporters), Thato An-Nakhl (possessed of date palms), Sayyidat Al-Beldaan (eminent of towns), That Al-Ahrraar (possessor of nobility), Daar Al-Akhyaar (abode of superiority), Al-Marhoomah (the kindness), Al-Khairah (the best), Al-Shafa’ah (the mediator), Al-Mubaarakah (the blessed), Al-Mu’minah (the believer), Al-Marzoogah (the successful)(http://www.al-madinah.org/engl2004) and (Kaki 2000).

3.1.5 Why has ‘Medina’ not been used as a name?

Medina is used in some references as the name of the Prophet’s City especially by non-Arabs. But it is avoided here in this research for the following reasons. Firstly, it is pronounced in the Qur’an and Sunna as Al-Madinah. Secondly, it is common to hear this name from local people, and Muslims abroad call it ‘al-Madinah’ with ‘al’ at the start which means ‘the’, which means it is very famous and well known. Thirdly, when this author did a simple search in ((Society 1996-2004)) he got the following results for ‘medina’; and the one in Saudi Arabia is a late result:

| Medina, Arkansas, United States | Medina, Kansas, United States |
| Medina, Michigan, United States | Medina, Minnesota, United States |
| Medina, New York, United States | Medina, North Dakota, United States |
| Medina, Ohio, United States | Medina, Puerto Rico, United States |
| Medina, Tennessee, United States | Medina (Bandera County), Texas, United States |
| Medina (Zapata County), Texas, United States | Medina, Washington, United States |
| Medina, West Virginia, United States | Medina, Wisconsin, United States |
| Medina Junction, Wisconsin, United States | Medina Plaza, Colorado, United States |
| Medinah, Illinois, United States | Medina County, Ohio, United States |
| Medina County, Texas, United States | Medina, Saudi Arabia |
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But it was the first city to appear when the name was searched as 'al-Madinah'. Therefore it is an easy name to find, without being misled in the search process. Furthermore recent research by the Kaki brothers uses Al-Madinah as the official name (Kaki 1998), and (Kaki 2000).

3.2 Why is Al-Al-Madinah important?

3.2.1 It was the first Islamic capital dating from September 622 AD, when Prophet Mohammed built his Mosque there as the core of a new community making the city the peaceful sanctuary of Prophet Mohammed. Ten years later (June 632 AD) Prophet Mohammed died. He was buried in his wife Aisha's 'Hujrah' (room) which later became an extension of the mosque. Then Al-Madinah became a major destination as a holy place for many visitors and pilgrims who perform Hajj, even after the capital was shifted to Al-Kofa by the caliph Ali Bin Abu Talib in 656 AD. This importance still remains valid. Because it is holy it has many mosques, such as the Mosque of Quba'a and the Mosque of Qiblatain. Moreover, more than thirty Hadith (statements by Prophet Mohamed, Peace be upon him) have been narrated by Bokhari, Muslim and Musnad, saying how the Prophet's supporters and followers said they heard the Prophet stating the importance of Al-Madinah. The following are some of them:

- Prophet Mohammed, when he was leaving Mecca, said:
  
  'Oh Allah, who took me out of my most loved place, please take me to yours'.

- And The Prophet (Peace be upon him) said: "O Lord, make Al-Madinah beloved to us, as we love Makkah, or of a stronger love."

- 'Whoever of you could die in Al-Madinah then do so, I will be a witness for him/her'.

- Narrated by Abu-Horairah, Allah's Messenger (Prophet Mohammed) said:
  
  'One Salat [prayer] in my mosque is better than a thousand elsewhere, except Al-Masjid Al-Haram [Mecca Mosque]'. (Sahih Al-Bokhari, Hadith No. 282, Vol.2)

- Moreover, Abu-Horairah narrated that Allah's Messenger said:
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‘Do not set out on a journey except to go to three mosques; i.e. Al-Masjid Al-Haram [in Makkah], my mosque [at Al-Madinah], and the mosque of Al-Aqsa [Jerusalem’s Mosque’]. (Sahih Al-Bokhari, Hadith No. 281, Vol.2)

- ‘Bokhari narrated that Anas bin Malik narrated (Allah to be pleased with him) that Allah’s Prophet (Peace be upon him) said, "O Allah bestow your blessings on their measures, bless their Mudd and Saa². “The Prophet means people of Madinah”. (http://www.al-madinah.org/engl/2004)

- Ahmed stated that Abu Horairah narrated that the Prophet (PBH) said:

  *I have been ordered by God to a town that eats towns. They call it ‘Yathrib’, but it is Al-Madina...*(Ministry of Islamic Affairs 2005)

So, Muslims believe that Madinah is considered as a holy place that been chosen by God to be the capital of Islam; a blessed place in its measurements; and a holy destiny to visit; to live; and to die in if possible. Yet, this importance increases the value of living here and affects the urban form regarding the social value and fellowship of the Quran’s and Prophet’s (PBH) orders.

3.2.2 Al-Madinah had a unique form of neighbourhood called ‘Ahwash’, or Hoash as the singular, which means ‘court’. It is defined as:

*An enclosed space; a courtyard; an uncovered area shut in by the walls of a building, or by different buildings; also, a space opening from a street and nearly surrounded by houses; a blind alley.*

(http://www.brainydictionary.com/2001)

In Al-Madinah, ‘Hoash’ was an urban system of gathering groups of buildings for security reasons after urban extension went beyond the city walls in the sixteenth century. Most of them were demolished in 1991 in the process of the King Fahad Extension Project for the Prophet’s Mosque and the Central Area. About 78 Hoash were identified from a map in 1953 AD (Al-Hosayin 1992). Chapter five has more details of these old courts or ‘Ahwash’.

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² Mudd and Saa are measurements pots for selling foods such as wheat, rice, dates, and barley in Arab countries.
3.3 Location, geography and climate

3.3.1 Location and geography

Al-Madinah is one of the major cities in Saudi Arabia and the western region of Al-Hijaz. It lies on the northern latitude 24° 29’ 6” and the eastern longitude 39° 36’ 16”. It is located about 150 Km east of the Red Sea, and about 420 Km from Makkah. Al-Madinah is an oasis between two mountains; Ohod from the north, and E’ir from the south. From both east and west, three main valleys cross this oasis. They are: Wadil Aqeeq in the west, Wade Bat’haan from south to west, and Wadi Qanah in the north. Consequently it has a high level of subterranean water and farmlands used to cover its suburbs and even the inner areas, but some has been eroded by urban land (Al-Harbi 1998).

Figure 3.1: Saudi Arabia Map, Borders, main Cities and location of Al-Madinah
Source: Map adapted from (Esri, Arcmap), database and edited by researcher
3.3.2 Climate

The Temperature is between 28°C and 42°C throughout the summer; in June, July and August it can reach a high of 48°C with a mean of 37°C. In winter it is between 7°C and 29°C. Humidity is quite low throughout the year. In general the mean humidity is about 25%, except when it rains in winter. Rainfall is an average of 3.94 mm/month. It is very rare in September, but in April it reaches a maximum rate of 12.2 mm/month. In the rainy season, some districts suffer from floods, even new, planned areas, and within the second ring road as seen below in figure 3.3. Winds in Al-Madinah generally come from the southwest with speeds of between 5 and 8 Knots (Kaki 1998).
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3.4 Area and Population Social/Economic Figures

3.4.1 Area

Al-Madinah County has an area of 2,596.5 km². The area of Al-Madinah as a city is 589 km². The urban area is about 293 km² (Amanat Al-Madinah 2005). The remaining area is rough land, such as mountains, deserts, valleys, farms, government land and roads as will be shown later in a digital map.

3.4.2 Population Growth

Makki (1985) shows the historical population growth of Al-Madinah since the sixth century AD prior to Islam. Mustafa, (1981), illustrates growth of the population between 1815 and 1975 AD. Since the Saudi era began in 1925, population has grown after a decline between 1910 and 1925; a period that includes the First World War and the Regional Wars between Othman, Hashemite, and Saudis where many Turks left Al-Madinah for Turkey. In 1950 the walls of Al-Madinah were demolished and urban areas spread out because of population growth. Real growth started after the end of the Second World War. Lipsky in 1959 estimated the population size to be about 40,000 (Al-Harrbi 1998). Three years later, national census figures gave a figure of about 50,000. It about doubled in four years from 198,186 in 1974 to 311,284 in 1978 because of migration from both inside and outside the country (Makki 1985). It was
about 608,000 in the 1991 census. It is estimated as 1,378,870 in 2001 (General Statistics, Ministry of Planning). The population accounts for about 75% of the county, and 65% of the region (Bokhari 2002). This attracts infrastructure and the services of people from surrounding towns and villages. Thus, internal migration to Al-Madinah continues. Migrants tend to head for their relatives who live in the suburbs of the city in either planned or informal areas. Figure 3.4 shows the population growth between 1959 and 2001. While the population size is 1,378,870, the number of households is estimated (by Planning 2000) as 239305 households. This means that size of household is about 5.8.

Figure 3.4: Population Growth with very high rate and 1.36 Million in 2000.
Sources: Mustafa (1981), Makki (1985), Kaki (1998), and Al-Harbi (1998), and manipulated in SPSS by researcher

3.4.3 Population Income

Income has declined since the first Gulf War and economic life has become harder than before. It seems it will never be the same again while the media still affects social attitudes, customs, trends and needs. An analytical report of the Saudi economy states that:

_In spite of the recent surge in its oil income, Saudi Arabia continues to face serious long-term economic challenges, including high rates of unemployment_
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(around 15%-20%), one of the world’s fastest population growth rates, and the consequent need for increased government spending. Saudi Arabia's per capita oil export revenues (in inflation adjusted dollars) remain far below high levels reached during the 1970s and early 1980s. This is in large part due to the fact that Saudi Arabia's young population has more than doubled since 1980, while oil export revenues in real terms have fallen sharply. Meanwhile, Saudi Arabia has faced nearly two decades of heavy budget and trade deficits, the expensive 1990/1991 war with Iraq, and total government debt approaching 100% of Saudi GDP. On the other hand, Saudi Arabia does have extensive -- around $110 billion -- foreign assets, which provide a substantial fiscal "cushion."

(Energy Information Administration 2003)

Only 40 % of the total labour force in Al-Madinah's population is employed. Employment is diverse between various trades and professional careers. The highest percentages are employed in construction, sales and trade, general administration and in the education sector as show below in table 3.1.

Table 3.1: Al-Madinah Economic activities and percentages

<table>
<thead>
<tr>
<th>Economic Activity</th>
<th>No. Pop Age (15 +)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Administration</td>
<td>58974</td>
<td>17.5</td>
</tr>
<tr>
<td>Construction</td>
<td>47695</td>
<td>14.2</td>
</tr>
<tr>
<td>Education</td>
<td>46453</td>
<td>13.8</td>
</tr>
<tr>
<td>Wholesale &amp; Retail Trade</td>
<td>42526</td>
<td>12.7</td>
</tr>
<tr>
<td>Agriculture &amp; Hunting</td>
<td>29004</td>
<td>8.6</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>25078</td>
<td>7.5</td>
</tr>
<tr>
<td>Private Households</td>
<td>20579</td>
<td>6.1</td>
</tr>
<tr>
<td>Transportation &amp; Communication</td>
<td>15907</td>
<td>4.7</td>
</tr>
<tr>
<td>Health &amp; Social Services</td>
<td>15939</td>
<td>4.7</td>
</tr>
<tr>
<td>Real Estate &amp; Business Services</td>
<td>11419</td>
<td>3.4</td>
</tr>
<tr>
<td>Restaurants &amp; Hotels</td>
<td>6462</td>
<td>1.9</td>
</tr>
<tr>
<td>Personnel &amp; Community Services</td>
<td>5432</td>
<td>1.6</td>
</tr>
<tr>
<td>Banking &amp; Insurance</td>
<td>3687</td>
<td>1.1</td>
</tr>
<tr>
<td>Electricity, Gas &amp; Water</td>
<td>3490</td>
<td>1.0</td>
</tr>
<tr>
<td>Petroleum &amp; Minerals</td>
<td>2027</td>
<td>0.7</td>
</tr>
<tr>
<td>Fishing</td>
<td>1218</td>
<td>0.4</td>
</tr>
<tr>
<td>Not Stated</td>
<td>372</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>336262</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: data sourced from (Saudi Arabian Ministry of Planning 2000), and edited by researcher Y.NEYAZI
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Population Not In The Labour Force (15 Years And Over ) in Al-Madinah Administrative Area

Figure 3.5: Unemployment diversity, and percentages.
Source: data were sourced from statistics of (Saudi Arabian Ministry of Planning 2000), and manipulated by researcher

This means that the unemployment rate is 60 %, which is very high (Saudi Arabian Ministry of Planning 2000). About 85% of the unemployed are Saudi’. The majority are females with a percentage of 71%. These labour forces follow one of the following cases. Those who are house keepers are about 51% of the unemployed. Students are about 37% of them and Retirees are only about 3%. The same percentage occurs for those who are self sufficient. The rest are disabled and others. Figure 3.5 shows distributions of the unemployment in Al-Madinah Administrative area. Thus, actual life costs are higher than the money earned and debts are the outcome for those households who rent super deluxe apartments and drive luxurious cars while they are still located in limited income groups. The question mark is highlighted here by Mr. Abdullah Al-Hazmi (the owner of an estate agent and other public services) who states:

‘Our expenditure is mainly spent on accessories but not on essential things, and sometimes we spend more than we earn. I don’t know how to explain this but it happens’. (Al-Hazmi 2001)

In terms of estates, he quotes that:

‘Demand for flats is very high but flat supply is very low. This may be due to the fact that most residents of Al-Madinah, and its surrounding areas, have left their villages because they do not get enough revenue from farming. They now, as you can see, work as taxi drivers using their own pick-ups vehicles’. (Al-Hazmi 2001)
He might be right, as shown above, as population growth was dramatically high especially in the last decade. Both sources of immigration, internal and external were causes for such an increase. The young are the majority of the population as about one million of the population are under the age of forty. The government will not be able to supply infrastructure demands in the near future because of population growth. While both females and males are mostly equal, males are found more by one third in age groups between 25 and 50, which are the age groups needing labour and the age of marriage for females. Interestingly, age groups less than 15 years old are the majority of the Al-Madinah population. They are about 42% of the total population. Of course, these groups are those who need attentions in terms of design of neighbourhoods to afford play areas and play grounds. Such amenities should be not far from their dwellings. When the current subdivision of neighbourhood planning is the grid iron, where will those groups play? The increase of males above females among groups aged 25-50 is because of the number of labourers and professionals who are mostly foreigners.

Figure 3.6: Al-Madinah population (age and sex groups)
Source: (Planning 2000), and manipulated by researcher
3.5 Urban Growth and Development

Urban expansion has been rapid and uncontrolled for many reasons. The major reasons were:

1) Prophet's Mosque's expansion project to accommodate about 400,000 capita in prayer

2) The Central zone surrounding the Mosque within the First Ring Road was redeveloped. It was a unique case for a Saudi city, where the old city was demolished completely except for a few mosques, the King Abdul Aziz Library, and the Saudi Telecommunications building. Thus, urban land spread beyond the natural boundaries of Al-Madinah

3) The foundation of the Real Estate Development Fund (REDF) in 1975 AD then encouraged immigration. It gave 19,461 loans up to the interview date of 17th March 2001 with Basheer Garrah (the head manager of REDF in Al-Madinah)

This means the REDF annually gave 748 loans for the last 26 years. More than four thousand people with plots of land to develop are waiting for their loans. Growth of the national economy and consequently the economies of cities in 1978 because of oil prices also led to the growth of Al-Madinah.

3.5.1 First comprehensive plan

Figure 3.7: Traditional Houses with mixed use; Buildings on the street are ground floor shops, and two extra housing floors.

Dar Al-Handasah, the consultancy office, prepared the first comprehensive plan for Al-Madinah in 1988. The contract involved studying, planning and predicting development until 2010 AD (Al-Amanah, No: 12, 1996). The study shows that most of the urban areas are concentrated south and west of the Prophet’s Mosque, especially in Quba’a and Al-Awally, while the other areas were mostly farms or desert. In addition, shops surrounded the Mosque. The remarkable use of properties as a mix of residential and commercial within these areas is shown in figure 3.7.

3.5.2 High demands

Demand for housing lots has increased. Immigration, which has three forms in Al-Madinah, caused a high demand for housing. One form was internal immigration of those who like to have modern homes and designs in new districts, and those who have been able to move from the central zone around the Mosque. The second was semi-external immigration of those who came from rural areas, where the Al-Madinah region is the largest in Al-Hijaz, the western part of Saudi Arabia. The last is external immigration of those who came from other Islamic countries hoping to stay in the Holy City after what has been said of the importance of Al-Madinah in the Prophet’s ‘Hadith’. Makki (1985) sourced immigration rates using the place of birth of the household head. Internal immigration accounts for about 28%, while external immigration is about 41%. The remaining numbers are native residents. Figure 3.7 shows this with more detail.

Figure 3.8: Place of Birth for Household Head to source Immigration
Source: data sourced from Makki 1985, and edited and graphed by researcher
Neighbourhood Plans were approved to supply plots for expected future needs and demands of development. Unfortunately, the Gulf War in 1990 affected the national economy with a rapid decline in the value of natural resources within the global economy and the related value of manufactured products. Moreover, the REDF fund has stopped and loans are funded only by revenue obtained from previous loans, but the REDF loans cannot cover these high demands. Applicants for loans may wait more than ten years. The researcher himself has applied since 1994, and has received the loan that he applied for by June 2006.

Consequently there is a decline in disposable income for households, lower expenditures by firms and governments, and a low level of confidence in general economic improvements (Global World, UN, 1996). Most of the country’s income went in paying back debts from the Gulf War and life is not the same as it was in the 1980s, unless a major change in policy and regulations occurs to deal with this rapid decline. Therefore, most of these new neighbourhood plans and partially the old ones are still vacant. Owners can not build on their lots and some are still tenants waiting for REDF loans. Others sold their plots to use money to upgrade their rented residential units. Even those who received REDF loans had extra loans from banks or car companies because plots of new plans are large, especially comprised ones, and consequently their construction costs are high.

3.5.3 The comprising schemes

The comprising scheme is a very old system which was started by the Prophet (PBH). He comprised his immigrated companions ‘Muhajreen’, those who came later from Makkah to Al-Madinah from vacant lands and lands granted for him from supporting companions or ‘Ansaar’, who were living in Al-Madinah. Lands were granted for building houses (Al-Harrbi 1998). His Caliphs Omar and Othman followed this scheme and granted Muslims who needed land for housing and some times they granted building costs but the grant was conditional as being developed within three years (Kaki 1998). Nowadays, government neighbourhood scheme grants are approved. About 30,256 plots were allocated to citizens between 1985 and 1995 (Al-Harrbi, 1998: 56), and about 22,270 plots between 1995 –1999 (Municipality 2000).

Figure 3.9 below shows the comprised plans aimed at citizens between 1985 and 1999 AD in Al-Madinah. The legal area of the lot is 625 sq. m, but Al-Amana increased plot area to average 950 sq. m. This increase in area was not free as each citizen will pay the
value of the added area. The average payment from each citizen is about SR 5,000, plus SR 1000 for the consultant’s fee (total about £1000). The total revenue of the increase between 1995 and 1999 is roughly about SR 111,000,000 (£20 millions). Despite where this money was spent, the question is how will the citizens build on this area of plot if they cannot pay the value of the added area? In addition, are these plots suitable for building and occupying in terms of infrastructure networks and the urban neighbourhood?

Figure 3.9: Al-Madinah Aerial Photo

The map shows comprised plans, boundaries of holy area, ring roads, and urban areas in Al-Madinah. Map was sourced from (http://www.imaratalmadinah.gov.sa/2003) and edited by the researcher using Paint Shop.

By 2000, the number of dwellings in Al-Madinah was about 240,000 which equals the number of households (Saudi Arabian Ministry of Planning 2000). Dwellings differ in types and the percentage of population who reside in them. Types of dwelling are shown in Figure 3.10. They are villas, apartments, houses, floors in villas or houses, or other types (tents, box houses). The largest percentage of the population lives in
apartments. This is about 46% of the total population. 39% of the total population live in villas. But these figures are estimated by the Ministry of Planning for Al-Madinah Administrative Area, not Al-Madinah city. Yet, this researcher thinks figures in the city differ and most of those plots allocated for villas are used for multi-dwellings, either two or four apartments within buildings of two floors, as an investment. This is because of the large area of the plots and high costs of construction and the high demand for dwellings so that people try to get back some revenue.

Table 3.2: Number of population per each type of dwellings and percentages

<table>
<thead>
<tr>
<th></th>
<th>Villa</th>
<th>House</th>
<th>Floor in Villa or in house</th>
<th>Apartment</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>541030</td>
<td>117853</td>
<td>26019</td>
<td>639710</td>
<td>54258</td>
</tr>
<tr>
<td>%</td>
<td>39.2</td>
<td>8.5</td>
<td>1.9</td>
<td>46.5</td>
<td>3.9</td>
</tr>
</tbody>
</table>

Source: (Saudi Arabian Ministry of Planning 2000), and manipulated by researcher

Figure 3.10: Types of dwellings and occupiers including households and total population

Source: (Saudi Arabian Ministry of Planning 2000), and manipulated by researcher

3.6 Ring Roads and Zones

As in figure (3.8) and in Figure (3.10) (maps for al Madinah show three zones and the ring-road concept), Al-Madinah is divided into three main zones as follows:

3.6.1 The first zone

This is the Central Area around the Prophet’s Mosque and inside the First Ring Road ‘King Faisal Road’. The first zone is a newly developed area of hotels, shops and
utilities to service pilgrims and visitors to the Prophet’s Mosque. Pilgrim housing standards and concepts have been studied by Al-Harrbi (1998). In the past the area was full of traditional houses and neighbourhoods which were called Ahwash, as mentioned before in the introduction. When the central area was developed it was demolished and redeveloped in total contrast to the original form. Enani (1998) and Kaki (2000) state that all the old town of Al-Madinah was transformed into a central business area surrounding the Prophet Mosque in the centre of the modern city. Buildings in this zone are about sixteen floors high. Some have bases for helicopters, fire exits, fire utilities, multi-elevators (lifts), marble frontages, central cooling systems, three or four underground parking lots, two floors for shopping centres and 14 floors for residential housing, either private or hotels. Examples of such buildings are shown below in figures 3.12 & 3.13.

Figure 3.11: Central Zone and districts of pilgrims and visitors accommodation

This zone is divided into five districts beside the Prophet Mosque and Al-Baqe‘e cemetery as shown in figure 3.11, and as follows:

1. Bidha’ah district is located to the north of the Prophet Mosque with an area of 343000 m²

2. Al-Manakhah district is located to the west of the Prophet Mosque with an area of 211,500 m².

3. An-Nagga district is located to the south-west of the Prophet Mosque with an area of 237,000 m².

4. Bani-Khodrah district is located to the south of the Prophet Mosque with an area of 240,000 m².

5. Bani-Annajar district is the last stage of the project and is located to the north east of the Prophet Mosque with an area of 244,000 m².

Figures 3.12 and 3.13: High-rise Buildings with high standards
3.6.2 The second Ring Road zone

It is the zone between the First Ring Road (King Faisal Road), which is surrounded by the Second Ring Road. This zone is mostly multi-storey buildings with heights between four and six floors. Few exceptions exist, such as high-rise buildings. Villas also exist but were built before building height regulations were finally set. In general, most buildings in this zone are apartment buildings. They vary in size and quality. Informal areas may also exist within this zone, especially to the west of the Prophet Mosque. During the last two decades, a lot of farm land was transformed into urban areas requiring high and fast revenue from subdivision sales. Vacant lands were left by owners who could not use them either because of a lack of development funds, or they are waiting for price increases and because there is no taxation law for such lands. This zone reflects conflicts between various types of housing units and plot size. Nevertheless, it is the zone with the highest population density because of the planned multi-storey buildings and informal areas, which have both multi-storey buildings and contemporary houses. The majority of people in this zone live in apartment dwellings, or contemporary houses within informal areas.
It is the outer zone of the first Ring Road where property belongs to local permanent and temporary residents who come to stay to study, train, or work. For students at the universities and colleges, single students may have the opportunity to stay in housing within student housing units that belong to the university, or they may have private renting opportunities in informal areas. Families may have private rented housing outside the university. Of course, such groups may want cheap housing such as small apartments within old districts or vernacular houses within informal areas. Labourers may share old houses, either vernacular or traditional, within areas around the central zone as Figure 3.15 shows clearly. On the other hand, teachers, doctors and other employees and their families, may have to rent private housing in new districts depending on their income group. In all, they have housing between the Second and Third Ring Roads. This zone includes all types of dwellings and has about half the population within.

Figure 3.15: labourers who live in traditional houses within the district near the First Ring Road, their tools are shown near to their doors

3.6.3 The last zone

This lies between the Second and Third Ring Roads. Land outside the last Ring Road is not allocated for residential development or the provision of infrastructure networks. Here is where most of the new plans are developed and comprised scheme plans are allocated except for one on the north east of Al-Madinah as shown in figure 3.9.
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This zone occupies about 40% of the villa dwellings as shown in table 3.2. Outside this zone, land is hardly developed unless for farming or industrial use. Few exceptions exist, and the infrastructure costs are the responsibility of land developers. Not all of these plans and plots within are villa dwellings as they are supposed to be. People tend to divert from villa plots to multi dwellings as apartments because of the large area of plots there. Yet the pattern of urban areas has been investigated to allocate capacity in Al-Madinah in terms of dwellings and population as shown later in chapter nine.

3.7 Patterns of Urban Areas

Urban areas have three main patterns. Each one differs in terms of type of the dwellings it has, ethnicity of residents and pattern of road networks between built areas. They also differ in amenities and services. These differences lead to fragmentary urban growth and extension of urban land far from the city centre. First are the planned areas which make up about 69% of the total urban area. This form of subdivided plan is familiar in both the second and third zones. They are either private plans or governmental ones. The second includes two types of urban patterns. Firstly is an unplanned or "haphazard" pattern, as Al-Harrbi (1998) translates the actual name, in Amanat Al-Madinah (Municipality of Al-Madinah). They comprise about 27% and most appeared before the 1980s. Then, there are redeveloped areas or transitional areas, which are the second type of informal land, comprising about 4% of the area. The map below in figure 3.16 shows three types of pattern of urban lands. Of course the third type is vacant land, either rough lands or farms lands which are neglected and are to be developed in the near future and this type is left in white in the map shown below. Building height ranged between one and six storeys, and 84.1% are either one or two floors, with the high rise buildings around the Mosque and main streets. Building condition was mostly poor, with only 34.7% in good condition. Building regulations and conditions vary between zones of the city. Buffers between zones are ring-roads that characterise the plan of Al-Madinah.

Figure 3.16: Final Al-Madinah Base map gained from both digital maps sourced from Al-Madinah Municipality and author digitizing, editing, and updating up writing up stage in early 2006
Economically, about 75% of Al-Madinah residents are not able to buy and build a plot of over 400 m². In addition they do not have permission. Either they are not able to pay the cost of construction for such a size of plot, or do not have lots to apply for. Less than a quarter of the samples have permission and they are either for building, or only just applying for an REDF loan.

It is essential for residents to have priorities for choosing an adequate house they can afford, live in, and then own. While poor households sell their plots to get urgent cash, others may buy these plots, because of low prices, for comprised schemes. Such plots are not fully serviced and neighbourhood plans are mostly vacant. Many of these households cannot buy well-serviced plots, nor can they build on those that are far from the centre and un-serviced. They buy these either to apply for an REDF loan, or to get some extra revenue by reselling them in the near future. Many unemployed and some employed men work as real estate agents in such comprised scheme plans. Their offices are rugs to sit on, a copy of the plans, and Arabic coffee and tea. In a few cases caravans are used as offices. Their working hours are between 4 and 7 pm.

A few landlords invest in their plots as vacation units. They develop them as weekend places for themselves, and others to rent. The rent for a day or a night is between SR 400 and SR 1,000. The cost may change depending on the facilities they have, the season, and the occasion for which they are renting. Most of these properties are built on large plots that include swimming pools and playgrounds. They are predominantly located in north and south Al-Madinah because of the surrounding farm land far from crowded residential areas.

3.7.1 Private plans

Private plans were once farms that had been neglected or died because of lack of water. Diversion of original land use in tenure deeds to residential use is the most difficult process. However most of these urban lands and built-up districts were diverted to residential lands and then subdivided. Saleable areas are the biggest objective for developers. So, they try to maintain a maximum number of plots they can get from their total area of land. Available plots are either expensive because of services and the distance to the Prophet Mosque or cheap because they lack services and are outside the Holy area. Landlords always seek the most attractive areas or plots. Although they tend to have narrow roads, they can sub-divide the most attractive plots. This occurs on expensive plots, whether the areas are suitable for high rise buildings or not, or whether
the roads are wide enough to have more street parking areas. They tend to have roads of about 10 to 12 m wide which is the minimum width of streets in the new plans.

Figure 3.17: Location and detailed actual recent aerial photo for plans approved in 1994

Plan is still undeveloped. Plot sizes are not big enough for two apartment dwellings and too large for one apartment in each floor; moreover streets are too narrow for high rise building plans. Aerial photo sourced from Al-Madinah Map Explorer (Amanat Al-Madinah 2005)

One example is given here to show how size and price affect the use of such plots in such plans. In plans indicated above, in figure 3.17, only street plots are developed for commercial use and big superstores. Inner plots that are still undeveloped are either sold or not. The landlord was advised by this researcher, when he was the planner at Amanat Al-Madinah Al-Monawarah (Municipality) as an advisor for neighbourhood plans, to increase the area of the plots and widen streets. The landlord is an architect, consultant and business man, but didn’t study the plan measurements well. Of course, the plan went through the approval process and was approved according to the landlord’s measurements and he got the results he wanted. The total land produced about ninety million SR. More than 40% of the primary prices were discounted and no exact information was given about the un-sold plots (land developers sales agents...
always say: if there are only two or three plots remaining for sale, show the worst.).
The aerial photo in Figure 3.16 shows vacant land in such a neighbourhood plan and
how surrounding areas have been developed and inner plots left undeveloped because
the plot areas are not large enough for apartment dwellings.

3.7.2 Governmental Plans

Governmental plans include comprised plans by both the Ministry of Defence and the
Municipality. The former has a faster process and spreads development to the west of
the city. There are services and utilities available because of the existence of the
stadium and the location of training centres for the Army and National Guard to the
west of Al-Madinah.

Sizes of plot vary between 625 up to 1,500 m². Plan is based on Cul-de-Sac approach as it is
considered similar to 'Hoash', the traditional neighbourhood unit in Al-Madinah
Aerial photo sourced from Al-Madinah Map Explorer (Amanat Al-Madinah 2005)

The plots in the defence plans have areas of 400 m² and over, but in Municipality
scheme plans they are over 625 m². Such a comprised plan is shown in Figure 3.18.
Municipality comprised plots are mostly larger than 625 m². Applicants should pay the
price of the extra area if the granted plot is larger than 625 m² before he/she receives the ownership deed. Revenues from comprised plans were very high and if they had been invested in the infrastructure, then all comprising plans would be fully serviced. Only main streets were partially asphalted. Prices vary between 20,000 SR and 200,000 SR (2002 prices), and SR 60,000 and SR 300,000 (prices 2005). Plots are large in area; they vary between 625 m² to 1500 m². Most plans are cul-de-sac concepts, similar to the Hoash approach. Figure 3.18 above shows this plan and a plot of 1100 m².

3.7.3 **Vacant Land**

Vacant lands are either plots, which are subdivided from larger plans and not yet built up, or rough land. Rough land has un-known owners, landlords who are waiting for high prices before they develop and sell, or the land is designated for agricultural use in their deeds, but neglected and not irrigated or farmed, ready to be subdivided in the near future. Application for development requires the alteration of original land use in tenure deeds, which is a long and difficult process. About 86% of total land area of Al-Madinah urban boundaries is vacant (Saudi Arabian Ministry of Planning 2000). Moreover, Figure 3.18 above shows how many plots have been developed in the subdivided lands in Shuran Governmental grant plan, But Figure 3.16 shows rough vacant lands in Al-Madinah.

3.7.4 **Informal Areas**

Unlike most informal areas in other cities in the World and Saudi Arabia, informal districts may have access to basic services and utilities. But at the same time they lack other amenities which are very important to life inside the districts. As stated above, migration rates have increased internally and partially externally. Three decades ago, urban areas grew randomly or in organic form with no planning reviews. An-Ne’aim (2004) quotes that most Arabian cities had very high urban growth rates, especially capital cities. He describes such districts as a full of social, economic, urban and security problems. He states that it is very important to deal with such districts to upgrade their built environment and provide them with important services and amenities. Thus, he continued, Informal districts issues are very strongly related to urban planning to set up programmes and policies to avoid any extra sprawl of such form of built environment (An-Ne'aïm 2004).
Chapter Three: Al-Madinah as a case study for defragmentation of urban space

In general, externality of informal patterns started because of Bedouin migrations from the desert to urban regions. They used to stay on any land without any consideration for tenure regulations or planning policies moreover and regarding Islamic law of revitalizing land if it is vacant and not owned by someone. If it is owned and someone came and built on it or planted over it then the developer should remove what he has built on the land.

Thus, most new migrants came into the suburbs and extended on to the land and started to build their own dwellings with their basic knowledge, simple building materials and limited budgets. They built dwellings on mountains or farm edges. Of course, their relatives and the new generation started to build new dwellings adjacent to them and so informal areas were formed. After a while, and after they managed to acquire tenure deeds for their dwellings, they started to build concrete buildings on those plots and those areas with organic subdivisions. Most of these districts grew around the old Madinah before the project for the Extension of Prophet Mosque. Then, after urban growth extended outside those informal areas they formed part of the inside of the city.
Meanwhile, government and other infrastructure bodies faced difficulties in providing such areas of high demand of services and connecting narrow roads to reach each dwelling. Kaki (1998) quotes that the area of these informal patterns is about 3,860 Hectares, which is about 75% of the total urban area, and provision of infrastructure networks is very expensive.

All informal areas are mostly located within the 2nd Ring Road and very few are around mountains and near to farms.

The municipality aimed to develop these areas and set a policy of 'Reorganise Informal Areas' within the department of City Planning. But because of lack of planning and basic amenities for an acceptable level of living standards; residents left these areas and moved to other new areas. Kaki (1998), states that these areas have many problems. Decline in socio-economic levels for these informal areas led to bad behaviour and extends to the next urban area. Most buildings are neglected with no concern for safety and security in these areas. Even rented buildings for governmental services and utilities are unsafe and insecure for their actual goals of provision. Roads are mostly in bad condition and unsuitable for traffic. Illegal extension onto vacant lands led to lack of open spaces for social and leisure activities and parking. Such areas extended to

Figure 3.20: Four case studies which are detailed below are shown by location to the Prophet's Mosque.
farm lands and palm orchards, which is one of Al-Madinah’s main characteristics. As shown in Figure 3.16 informal areas are located in different areas in Al-Madinah. Patterns of plots and building in urban areas are almost similar in all informal areas but it differs in transitional ones as shown in Figure 3.19.

Four informal areas were studied by Administration of Passports and Control for Migrants. Two of these districts are in the west of Al-Madinah. They are Al-Khidhir and Al-A’nabis. The third is to the northeast of the central area. It is called Al-Ejabah. Figure 3.20 shows their locations with numbers. The fourth is Ad-Dowaimah which is located in the south of Al-Madinah and within the second ring road. Details of them are as follows:

a) Al-Khidhir Informal District

This is located to the south west of the central area (no. 43 in figure 3.20). It is south of As-Soqia District, west of Al-Esaiferain District and the Second ring Road, east to Al-Estasion Train Station, and north to Omar Bin Al-Khattab Road. The map in Figure 3.20 shows its location and surrounding districts. Its total area is about 315,000 m². Total population is estimated at around 10,000. About 55% of the total district’s population is non Saudis. Non Saudi minorities are Mauritanians, other Africans, Pakistani’s, Bangladeshi’s, Indians, Egyptians and Sudanese. Social status is very poor because of lack of education as stated in the report. The district has been described as the report states:

'It seems as a traditional district that views Omar Bin Al-Khattab Road. Most of its houses are locals, and consist of one or two floors, which been built in informal way and don't afford any characteristics of urban modernism. District lacks planning, and urban organization. Most of its internal streets are characterized by either narrow or dead ends.' (Al-Mohammadi, Al-Ahmedy et al. 2000)

With regard to the figures of (Saudi Arabian Ministry of Planning 2000), the number of households will be about 1724 (10,000/ 5.8). In general, each household has an area of 183 m² including roads and areas of all amenities and services. Of course density seems very high. About 200 amenities and services are included within its boundaries. Table 3.3 shows details of these amenities and services and the mean number of households who share each amenity or service and each establishment per area of total district. Of course the calculation here for households per establishment was done by dividing total
population by number of amenities or services and then dividing the result by 5.8 for household size as mentioned above (Saudi Arabian Ministry of Planning 2000). Every 144 households share a mosque. Every 72 households share a school. Every 431 households share either a primary or intermediate school. Moreover, 862 households share a primary or a secondary boys or girl’s school. Meanwhile, neither secondary schools nor nurseries are afforded in this district. The surgery seems very busy. The number of clinics it includes is not mentioned in the report. The number of mini markets and other retail activities seem sufficient for residents. Twenty one industrial activities such as workshops and storages are located inside the residential district. This might be because of the bad condition of some properties as residential units, or land in this district being unsuitable for building, so landlords divert the use to an industrial one for easy profits from land or old buildings.

Table 3.3: Al-Khidhir amenities and retail services with regard to populations and number of households sharing each single service

<table>
<thead>
<tr>
<th>Amenity or Service</th>
<th>No</th>
<th>People</th>
<th>Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mosque</td>
<td>12</td>
<td>833</td>
<td>144</td>
</tr>
<tr>
<td>School</td>
<td>8</td>
<td>1,250</td>
<td>216</td>
</tr>
<tr>
<td>Surgery</td>
<td>1</td>
<td>10,000</td>
<td>1,724</td>
</tr>
<tr>
<td>Storage</td>
<td>3</td>
<td>3,330</td>
<td>574</td>
</tr>
<tr>
<td>Shopping Centre</td>
<td>1</td>
<td>10,000</td>
<td>1,724</td>
</tr>
<tr>
<td>Barber</td>
<td>9</td>
<td>1,111</td>
<td>192</td>
</tr>
<tr>
<td>Mini Market</td>
<td>52</td>
<td>192</td>
<td>33</td>
</tr>
<tr>
<td>Café</td>
<td>9</td>
<td>1,111</td>
<td>192</td>
</tr>
<tr>
<td>Restaurant</td>
<td>14</td>
<td>714</td>
<td>123</td>
</tr>
<tr>
<td>Bakery</td>
<td>11</td>
<td>909</td>
<td>157</td>
</tr>
<tr>
<td>Kitting</td>
<td>10</td>
<td>1,000</td>
<td>172</td>
</tr>
<tr>
<td>Butcher and chicken</td>
<td>4</td>
<td>2,500</td>
<td>431</td>
</tr>
<tr>
<td>Real Estate Agent</td>
<td>12</td>
<td>833</td>
<td>144</td>
</tr>
<tr>
<td>Workshop</td>
<td>18</td>
<td>556</td>
<td>96</td>
</tr>
<tr>
<td>Dress maker</td>
<td>13</td>
<td>769</td>
<td>133</td>
</tr>
<tr>
<td>Laundry</td>
<td>15</td>
<td>667</td>
<td>115</td>
</tr>
</tbody>
</table>

Source: data were sourced from (Al-Mohammadi, Al-Ahmedy et al. 2000), and manipulated, calculated and summarized by researcher.

By looking at the map, it can be seen there are no parks, playgrounds or clubs in this district. Thus, recreational activities are lacking. Students studying in the eight schools amount to about 3,300 in the primary and intermediate schools. About 57% of the totals
are boys. Playgrounds are available only in their schools in the morning and when they finish school the gates are closed and consequently playgrounds are not for use. Moreover, there are younger or older people who cannot afford areas for their activities especially during the summer. One of the main results concluded in the report is that all roads in the district are not paved or asphalted and 98% of labourers are non Saudi’s. This gives an indicator that unemployment is high among Saudi’s who live in this district.

c) Al-A’nabis Informal District

Al-A’nabis is located west of the central area (no. 66 in figure 3.20). It is surrounded by ‘Street of Train Line’ from east, ‘Mid Ring Road’ from west, ‘Khalid Eben AL-Waleed’ Street from the north, and from the south ‘As-Salam Road’. It has three planned areas which are viewed from the surrounding main roads. The area is roughly about two million m². Its total population is about 17,677 with 2,398 households. It means that each household should have 834 m², but this is a total area including all amenities and service areas. Moreover, three planned areas, one salvage garage and two large farms exist within the boundaries of the district. Nevertheless, there are many areas where houses have more than two floors, which increases density from the figure just quoted.

Household size here is about 7.4 which is high according to the statistics of the Ministry of Planning. But the report mentions that single people are in the majority of residents in the district. The majority of residents are Saudi’s. Minorities are mostly Mauritanians, Chadian, Pakistani’s, Indians and Egyptians. In total they come to about 18%. The district been described in the report of Administration of Passports and Control for Migrants as follows:

‘One of main causes attracting migrants to this district is the short distance to Prophet’s Mosque, and low value of rent for houses. Most of houses are locals, streets are narrow. There are good relationships between Saudi and Non-Saudi children because of the neighbourhood. The district is considered at intermediate social level. But it still has some crimes such as thefts of cars or from shops because of high rates of unemployment.’ (Al-Mohammadi, Al-Hebaishi et al. 2000)

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4 This street is built on the old railway of the Ottoman era, and still called Train Street.
Table 3.4: Amenities and retail shops in Al-A’nabis Informal district with regard to number to population and household served by each.

<table>
<thead>
<tr>
<th>Amenity or Service</th>
<th>No</th>
<th>Capita’s</th>
<th>Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mosque</td>
<td>20</td>
<td>884</td>
<td>120</td>
</tr>
<tr>
<td>Boys Schools</td>
<td>7</td>
<td>2,525</td>
<td>343</td>
</tr>
<tr>
<td>Girls Schools</td>
<td>6</td>
<td>2,946</td>
<td>400</td>
</tr>
<tr>
<td>Surgery</td>
<td>2</td>
<td>17677</td>
<td>2,398</td>
</tr>
<tr>
<td>Shopping Centre</td>
<td>2</td>
<td>8,839</td>
<td>1,199</td>
</tr>
<tr>
<td>Barber</td>
<td>23</td>
<td>769</td>
<td>104</td>
</tr>
<tr>
<td>Mini Market</td>
<td>67</td>
<td>264</td>
<td>36</td>
</tr>
<tr>
<td>Restaurants and cafes</td>
<td>39</td>
<td>453</td>
<td>61</td>
</tr>
<tr>
<td>Stationeries</td>
<td>13</td>
<td>1,360</td>
<td>184</td>
</tr>
<tr>
<td>Bakery</td>
<td>19</td>
<td>930</td>
<td>126</td>
</tr>
<tr>
<td>Kitting</td>
<td>19</td>
<td>930</td>
<td>126</td>
</tr>
<tr>
<td>Butcher and chicken</td>
<td>6</td>
<td>2,946</td>
<td>400</td>
</tr>
<tr>
<td>Real Estate Agent</td>
<td>5</td>
<td>3,535</td>
<td>480</td>
</tr>
<tr>
<td>Furniture Workshops</td>
<td>19</td>
<td>930</td>
<td>126</td>
</tr>
<tr>
<td>Electrical shops</td>
<td>10</td>
<td>1768</td>
<td>240</td>
</tr>
<tr>
<td>Clothes shops</td>
<td>80</td>
<td>221</td>
<td>30</td>
</tr>
<tr>
<td>Dress maker</td>
<td>23</td>
<td>769</td>
<td>104</td>
</tr>
<tr>
<td>Laundry</td>
<td>17</td>
<td>1,040</td>
<td>141</td>
</tr>
</tbody>
</table>

Source: data sourced from (Al-Mohammadi, Al-Hebaishi et al. 2000), and been manipulated, calculated and summarized by researcher

As shown in the table above, the population shares two surgeries. It has double the population of the previous informal district. Both boys and girls schools are very crowded. Clothes shops and restaurants are very common. This means it is because the two shopping centers and areas seem to serve the surrounding districts. Mosques are less crowded than the previous district. This district has a small park, but it is not enough for a tenth of its population on a regular basis. Playgrounds and play areas are lacking here. Nurseries are also lacking for children in the early years. Narrow roads and dead ends slow down traffic speed and afford spaces for playing, but not in all parts of the district. The district includes many centers which serve half of Al-Madinah City. They are: Centre of Social Services; Fire Station; Welfare Society and other governmental bodies.

A total of 424 household heads are non Saudi labourers, who work within retail activities. About one quarter of them are illegally in Saudi Arabia. It may be due to the nearest labour market which is at the corner of the district adjacent to the central area.
Generally, the main negatives of the district are unlit streets and narrow and dead end streets. Many streets are not asphalted.

c) **Al-Ejabah Informal District**

This is one of the nearest informal districts to the Central Area and only 400m from Prophet’s Mosque. It is located east of the central zone and approaching ‘King Faisal Road’ (as shown in no 57 in Figure 3.20). Moreover, its importance is because of its location between two special shopping centers. The first is ‘Al-E’nabiah Souq’ for clothes and accessories, and the cluster of ‘Al-A’amedah’ Street, which is for building materials, electrical and plumbing tools. This street is the eastern boundary of Al-Ejabah informal district. It is a main corridor for all the area. Its length is about 800 m, and width is about 20 m. It is very crowded with traffic because of the shops and trading activities.

From the north it is surrounded by Airport Road about 800 m. in length. King Abdulaziz Road surrounds Al-Ejabah from the south and is 700 m. in length. It is a new highway road for easy access from Prophet’s Mosque and central area directly to Al-Madinah Airport. The eastern boundary is King Faisal Road which is 500 m. in length.

![Nationalities of Households in Al-Ejabah district](image)

**Figure 3.20: Percentages of Populations nationalities in Al-Ejabah district**

Source: Data sourced from (Al-Mohammadi, Al-Ahmedy et al. 2000), and manipulated by author
Al-Ejabah has an area of about 560,000 m², 70% of which is used by residential areas and 30% for old farms and vacant lands. Population size is estimated at about 1,291 households according to Health files registered in the local surgery in the district. Therefore the size of household is about 6.2. Space for each household in general is 434 m², and 304 m²/household if calculated without the area of old farms and vacant lands. Moreover, there are other workshop areas which use large areas and other governmental services and amenities in the district. Thus, it is lower than this area per household. The population’s ethnicity varies. Non Saudi households are about 41% of the total in the district. Figure 3.21 shows nationalities and their percentage in Al-Ejabah district.

Table 3.5: Amenities and retails shops in Al-Ejabah Informal district with regard to number to population and household served by each amenity or service

<table>
<thead>
<tr>
<th>Amenity or Service</th>
<th>No</th>
<th>People</th>
<th>Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mosque</td>
<td>2</td>
<td>4,000</td>
<td>646</td>
</tr>
<tr>
<td>Boys Schools</td>
<td>2</td>
<td>4,000</td>
<td>646</td>
</tr>
<tr>
<td>Surgery</td>
<td>1</td>
<td>8,000</td>
<td>1,291</td>
</tr>
<tr>
<td>Barber</td>
<td>5</td>
<td>1,600</td>
<td>258</td>
</tr>
<tr>
<td>Cafes</td>
<td>15</td>
<td>533</td>
<td>86</td>
</tr>
<tr>
<td>Restaurants</td>
<td>8</td>
<td>1,000</td>
<td>161</td>
</tr>
<tr>
<td>Bakery</td>
<td>4</td>
<td>2,000</td>
<td>323</td>
</tr>
<tr>
<td>Kitting</td>
<td>4</td>
<td>2,000</td>
<td>323</td>
</tr>
<tr>
<td>Butcher and chicken</td>
<td>21</td>
<td>381</td>
<td>61</td>
</tr>
<tr>
<td>Real Estate Agent</td>
<td>11</td>
<td>727</td>
<td>117</td>
</tr>
<tr>
<td>Workshops</td>
<td>25</td>
<td>320</td>
<td>52</td>
</tr>
<tr>
<td>other shops</td>
<td>28</td>
<td>286</td>
<td>46</td>
</tr>
<tr>
<td>Clean Water shops</td>
<td>4</td>
<td>2,000</td>
<td>323</td>
</tr>
<tr>
<td>Dress maker</td>
<td>6</td>
<td>1,333</td>
<td>215</td>
</tr>
<tr>
<td>Laundry</td>
<td>7</td>
<td>1,143</td>
<td>184</td>
</tr>
</tbody>
</table>

Source: data sourced from (Al-Mohammadi, Al-Hebaishi et al. 2000), and manipulated, calculated and summarized by researcher

Internal roads are very narrow, have plenty of holes and are mostly one way. Houses are not geometrical in shape, but attached and terraced together. They are mostly non-courtyard houses. The value of rent is very low. Labourers and very poor people tend to reside in these areas. The size of population is too high for one surgery (clinic). This surgery serves most pilgrims during Hajj season. According to the report of (Al-Mohammadi, Al-Ahmedy et al. 2000), Saudi and Non-Saudi’s in this district have the
same level of education in general. All have simple jobs. A strange thing is that only a few African men work in retail activities within the district. Strong relationships are very noticeable between Africans. About 1,223 students are registered in both primary and intermediate boys’ schools. This means that every household has only one student at school. The percentage of non-Saudi students is 12% while non-Saudi household percentage is about 42%. Most children of non-Saudi families don’t go to school. Instead, they work on the streets, or go begging. Only 2 mosques serve residents, but because of the short distance to Prophet’s Mosque, residents tend to pray in the Prophet’s Mosque for more rewards.

These two mosques serve elderly people who can’t walk very far, or those working in surrounding areas. Moreover, non-Saudi children are noticeable in the Prophet’s Mosque studying the Qur’an in the evening. Playgrounds are available in vacant lands but are still very limited. Even in the Hajj season, most vacant lands are used for buses as parking areas. It is a district needing urgent upgrading. Open spaces currently vacant may be the main cause of good relationships between residents. Play areas for young children are lacking and roads are narrow but they have high traffic volume. Nurseries are also lacked by residents. It is very good example of the informal districts that grew up in the first stage of informal areas.

c) Ad-Dowaimah Informal District

Ad-Dowaimah district is located in the south of Al-Madinah city (no. 40 in figure 3.20). It is only 3 Kilometres from the Prophet’s Mosque and 200 metres from Quba’a Mosque. Quba’a Road with 2730 m. length is its boundary from the east. The Second Ring Road 2,470 m in length is the western boundary. The southern one is Al-Hijrah Road which is 1,170 m in length. The northern boundary is Al-Joboor informal district, about 2100 m length, which is the origin of the informal growth. Ad-Dowaimah is only an extension of Al-Joboor. Ad-Dowaimah is a very old district. Its area is about 2,280,000 m². It grew over three decades ago. The author lived in this district during his intermediate school when his parents bought a house there. Most of the houses were courtyard ones which reflect local Bedouin buildings. Building materials were mostly cement brick and wood for roofs, doors and windows. Outer doors were iron ones. Now, most houses are concrete ones, but poor in design and condition. The rent value is very low in this area. Most services and infrastructures are provided in this district.
Table 3.6: Amenities and retails shops in Ad-Dowaimah Informal district with regard to number to population and household served by each.

<table>
<thead>
<tr>
<th>Amenity or Service</th>
<th>No</th>
<th>Capita's/each</th>
<th>Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mosque</td>
<td>13</td>
<td>1,121</td>
<td>167</td>
</tr>
<tr>
<td>Boys Schools</td>
<td>6</td>
<td>2,430</td>
<td>362</td>
</tr>
<tr>
<td>Girls Schools</td>
<td>8</td>
<td>1,822</td>
<td>272</td>
</tr>
<tr>
<td>Surgery</td>
<td>1</td>
<td>14,577</td>
<td></td>
</tr>
<tr>
<td>Barber</td>
<td>10</td>
<td>1,458</td>
<td>217</td>
</tr>
<tr>
<td>Mini markets</td>
<td>55</td>
<td>256</td>
<td>40</td>
</tr>
<tr>
<td>Cafes</td>
<td>21</td>
<td>694</td>
<td>104</td>
</tr>
<tr>
<td>Restaurants</td>
<td>8</td>
<td>1,822</td>
<td>272</td>
</tr>
<tr>
<td>Bakery</td>
<td>6</td>
<td>2,430</td>
<td>362</td>
</tr>
<tr>
<td>Kitting</td>
<td>6</td>
<td>2,430</td>
<td>362</td>
</tr>
<tr>
<td>Butcher and chicken</td>
<td>2</td>
<td>7,289</td>
<td>1,087</td>
</tr>
<tr>
<td>Real Estate Agent</td>
<td>4</td>
<td>3,644</td>
<td>544</td>
</tr>
<tr>
<td>Furniture &amp; Workshops</td>
<td>14</td>
<td>1,041</td>
<td>155</td>
</tr>
<tr>
<td>other shops</td>
<td>2</td>
<td>1,325</td>
<td>1,087</td>
</tr>
<tr>
<td>Electric and Plumber tools</td>
<td>11</td>
<td>1,325</td>
<td>198</td>
</tr>
<tr>
<td>Dress maker</td>
<td>10</td>
<td>1,458</td>
<td>217</td>
</tr>
<tr>
<td>Laundry</td>
<td>5</td>
<td>2,915</td>
<td>435</td>
</tr>
</tbody>
</table>

Source: data sourced from (Al-Mohammadi, Al-Ahmedy et al. 2000), and been manipulated, calculated and summarized by researcher.

Population size is estimated by (Al-Mohammadi, Al-Ahmedy et al. 2000) using figures from surgeries files at around 14,577 capita. Total household numbers are 2,174, which means that household size is about 6.7. Children up to five years old number about 3,152, which is about 22% with a ratio of 1.4 Children (0-5)/ household. Children in schools are about 6,906 of which 10% are non-Saudis. In total, students make up 47% of the total population. Non-Saudis are mostly singles and live together as groups of over 10 capita/ dwelling. They are mostly labourers from Pakistani, Bangladesh or Africa. Women domestic workers are common during the day in this district. At night they tend to live in groups in their own apartments, which are well furnished.

As shown above in Table 3.6, the number of mosques is quite low in regard to the number of households praying in each. Each 40 households share a mini market. Boy's schools are more crowded than girls. Nurseries are lacking. Children are about 69% of the total population of Ad-Dowaimah district. Open spaces are lacking. The district is also shown in map Figure 3.20. It seems very crowded with only 1,049 m²/ Household.
However this ratio includes all schools, the reserved area of the old Castle, mountains, farms and other governmental service’s buildings.

All other informal areas are no better than those shown above. Thus, these areas are inadequate for residents and their children to live in, nor are they re-planned and developed in total as one project. Incremental re-planning and developing in these areas seems a waste of time, money and efforts.

3.8 Conclusion

Al-Madinah is the first Islamic capital. It was called Yathrib, and called Al-Madinah by Prophet Mohammed (PBUH), after he immigrated to and decided to establish his nation in this city. It has become a holy place since. The Prophet recommended his nation to live and die in Al-Madinah. Various spellings for its name were used by previous sources, but the last one, ‘Al-Madinah’ was decided by the local government as the official and electronic name for it.

Al-Madinah had a unique form of urban neighbourhood called Hoash. All of the old city was in this urban form, but because of the extension of the Prophet’s Mosque the whole old city was demolished and redeveloped in modern form. It was a development process but was also an explosion that fragmented urban patterns without any order or systems that showed any planning effort by the Municipality or other agencies. Moreover and because of Al-Madinah’s importance as the centre of its region, it had both inner and external immigration at high rates. Urban growth followed at a high rate too. Urban sprawls grew over the last three decades around the old city. New urban areas were planned around these places, yet informal areas have surrounded the central areas. Consequently, Al-Madinah has contradictory forms of urban neighbourhoods. All of the fragments which came out of the development of the central area show few traditional courts ‘Ahwash’ and there are bad urban conditions around the central area; informal areas with inappropriate road networks or recreational amenities; transition of informal areas which have been re-legalized, or new planned areas with high measures and standards that don’t allow mid and low income classes to buy land and build. The majority of residents live in apartments within the second zone. Alternatively, they might be dwelling within a villa as tenants. Informal areas seem part of the city but do not belong to it, so that no one is interested in developing the land here. Most middle class families either had a plot comprised from Al-Madinah Municipality or bought one for future development. Planned areas are attractive but far away and very expensive to
Chapter Three: Al-Madinah as a case study for defragmentation of urban space

develop. Even the comprising scheme didn’t solve this problem. In contrast it expanded it and now vacant land in Al-Madinah’s total area totals about 86%. Because fragmentary developments are scattered here and there without a clear direction or control and government’s infrastructure sectors efforts are so fragmented to supply services and utilities on the fringes then the informal areas lack some services. However, the author decided to use Al-Madinah as a case study for this research to explore the fragmentation, not only in urban areas but also in informal areas, farms and even in vacant lands.
Chapter Four: Research Methodology
4.1 Introduction

Research is an activity which aims to further knowledge by asking questions. It is to gather data, to ask, read, watch, take note, surf the web, to find problems and try to solve them, evaluate alternatives, improve them, then allocate the best, and make predictions for future expectations (Peterson 2000) and (Peil 1982).

This research has multiple approaches, containing both primary and secondary research. Investigation has been carried out using three main approaches. They are: wasteful building codes in neighbourhood planning; de-fragmentation: and use UIS as tool for planners. This study looks at three levels of urban living; households and dwelling units; districts or neighbourhoods; and the whole of Al-Madinah city. As shown in Chapter One, the primary issue is one of wasteful standards and measures for building regulations in Al-Madinah.

First approach examines the effects of recent regulations on households and their dwelling units, neighbourhoods and the city as a whole. It looks at present urban planning policies and strategies, then at future plans. Secondly, it tests socio-economic characteristics of households and shows their actual conditions in relation to housing measures and costs. Then, second approach tests different types of neighbourhoods, housing units and their sizes and the effects on costs of infrastructure networks within the whole city using UIS. Last approach attempts to model the process of neotraditional planning to test neighbourhood plans in the early stages of decision-making regarding the efficiency of network costs.

The goal here is to develop the neighbourhood in a better quality, which relates to culture of the Islamic city. Urban information systems are used as tools for future planners of Al-Madinah. Information systems here are used for data collection, entry, summarising and interpretation of data for conclusions. SPSS, EXCEL spread sheet, Word, Paint, and ArcGIS soft wares are used not only to present the research as shown below, but also in text and graphics, analysis and evaluation of the issue of wasteful measures and deprived neighbourhoods.

Moreover, it gives an empirical work for the case of Al-Madinah regarding the primary observations made by the researcher during his experience as a city planner in Al-Madinah Municipality between 1992-1994, and then as a teaching assistant in the Department of Urban and Regional Planning at King Abdulaziz University/ Jeddah/ Saudi Arabia. The research methodology seems similar to the planning process, but more deeply in details and analysis of both demographic and urban characteristics of
Chapter Four: Research Methodology

study area which is Al-Madinah to achieve principals and approaches. Changes in the methodology were required because of the special circumstances and difficulties in the case of Saudi Arabian cultural references, particularly in Al-Madinah. Details of the methodology are shown below.

4.2 Methodology (in proposal of research)

The scope and approach of the research led the researcher to review the Seventh Strategic Plan\(^1\) with regard to urban planning policies; and investigate applied building regulations within current neighbourhood plans, informal areas and traditional ones. This was done to uncover enough information to better understand the regulations and to what extent they are suitable for the public's needs. However, before undertaking analysis of such data, the research looks at the backgrounds of traditional neighbourhoods and buildings of Al-Madinah and how Islamic law affects the form of the built environment. Al-Madinah's community has changed with regard to its' social and economic characteristics and urban fabrics also have changed. Both changes are associated but are never recognised by most people in Al-Madinah.

Transformation from the traditional to post modern design of buildings and neighbourhoods has lead to criticism and evaluation of urban planning in the form of 'Neotraditional Planning' or 'Traditional Neighbourhood Planning' (Furuseth 1997). In both, it is proposed to development the quantity and quality of neighbourhood plans, arguing enough quantity will create better quality. On the other hand, wasteful quantities may cost a lot and remove any hope of reaching even the minimum quality. Wasteful measures in building regulations may allow groups with a high income to build their dream homes. In contrast, they might control and prevent less affluent groups from affording the minimum level of attachment to homes or neighbourhoods. The aim is for those middle and low income households to own their adequate dwelling units. Moreover, it is about quality of neighbourhood and neighbouring and the role of open space between dwellings in increasing relationships between neighbours. Quality is also related to satisfaction levels of residents with the amenities within the neighbourhood they live. It is also important that investigation should cover both quantitative and qualitative measures and regulations as follows:

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\(^1\) The five yearly strategic plan for 2000-2005
4.2.1 Research boundaries
The aims research is to increase the size of residents in Al-Madinah city of Saudi Arabia, those who will benefit from shift in the wasteful measures of building codes and regulations. The 'study area' is defined as the city of Al-Madinah. This is to limit the topic geographically from the Al-Madinah region. Moreover, neighbourhood planning has been selected to limit boundaries of planning issues to look for (Hart 2001). However, the literature and data required to conducting this research is limited. The rationale for choosing Al-Madinah as a case study has been shown in chapter three, as has the process of urban planning in Saudi Arabia, and in Al-Madinah. Narrowing down the research's topic of urban planning to the unique neighbourhood in Al-Madinah is in chapter five as specific case. Data collection will be a more complicated job than it is in developed countries (Azaz 2004). An extra extension for the field trip of an extra two months as shown in the data collection below was valuable. The author has used this approach as a methodology for planners, architects and sociologists, who want to read about cities and deal with their urban planning.

4.2.2 Quantitative data in the questionnaire
Standards and measures of the built environment are mostly quantitative, such as sizes of plot, house, rooms, kitchen, toilets and others measurable related issues such as size of households, total income, building costs, land price, transport costs, distance to amenities and cost of letting. These measures and standards have strong relationships with the quality of single dwelling units, neighbourhoods, and consequently the city as a whole. Thus the study considered these measures as components of the field work that was undertaken. Such data can be sourced from a census of houses and population and the last census held in Al-Madinah was in 1991. However figures and results varied depending on the publication. Qarrah states that there are many figures and he does not know which one is correct. He then adds 'how will planning be?' (Qarrah 2003). Therefore a questionnaire was essential for empirical study in order to collect figures for such measures of the quantity of the built environment. Moreover, norms for resident satisfaction of quality, either for residential units or neighbourhoods can be found in numbers and their analysis. Satisfaction reflects views and evaluation by residents of the qualities of the built environment they live in. This does not mean that other statistics and previous figures are false but all figures can be predicted using GIS technology as will be shown in chapter ten.

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4.2.3 Qualitative (interviews and space syntax for design plans)

It is important for the researcher to choose his or her interviewees carefully and people were interviewed for this research informally with regard to time and response (Ele, Anzul et al. 1991). The researcher contacted residents of Al-Madinah at informal gathering to gain a ‘snap shot’ of their opinions regarding planning issues and neighbourhood amenities. Then, if there was a high response, a questionnaire was given for few samples. Regarding views on quality, the researcher left an area for personal comments within the questionnaire that gave freedom for a person to express his/her ideas and views on urban issues related to dwelling units and neighbourhoods. While residential development and supply is left to the private sector and the power of capitalism, it is essential that public satisfaction of quality is examined. This is not only quantitative issue, but based on to allocate the quantity of dwelling unit that suite most of Al-Madinah residents to describe the quality as well. Different views and satisfaction levels were examined over the two urban patterns of informal areas and modern districts. However traditional neighbourhoods ‘Ahwash’ -which have been lost- are seen as a model for future community neighbourhoods. Moreover, the research examines satisfaction levels with types of residential units, whether villas, apartments or vernacular houses. Nonetheless, space syntax is used in research to show the similarity between the proposed dwelling unit based on satisfaction of residents and the traditional one. Proposal of dwelling units are designed and analysed by using gamma diagrams for samples of design plans those been selected from Municipality archives. Qualities of samples were also examined. Interviewees were questioned about educational levels, marital status, employment status, living with relatives, availability of domestic workers and nationality. Such questions were used to check sample variety through the community of Al-Madinah. They are not only used to give an introduction to social characteristics, but also to relate them during analysis to economic and urban characteristics.

4.2.4 Triangulation (questionnaire, permit samples and samples from digital maps)

On a small scale, multiple sources of data were used in data collection and sampling to increase accuracy of data. In the questionnaire, measurements of rooms and spaces within residential units are mostly approximates. Nevertheless, some corridors and utility areas have not been recorded. Therefore, other sources were used for calculating
exact measurements and their ratios by taking samples for detailed plans of Building Permits from the archive of Al-Madinah Municipality (Amanat Al-Madinah Al-Monawarah). On the other hand, the satisfaction levels of residents with their neighbourhoods are also used in ordinal categories. The questionnaire is the primary research or direct contact with residents is a direct source of data. Permits are secondary sources.

On a large scale, digital maps were used for sampling of various scenarios of urban patterns, sizes of plots and road layouts within each pattern. This triangulation of data sources was used to build up complete and integrated information about the current measures of residential units and neighbourhoods. Information and results were used in the analysis using urban information systems to examine the effects of costs on the dwellings of middle and low income groups. How current building regulations and measures of dwellings affect costs of the infrastructure network and the size of the city of Al-Madinah will then be examined. The researcher designed the questionnaire with regard to the data integration from citizens and decision-makers in Al-Madinah Municipality and others in related agencies and organizations.

4.3 Measures and scales for the topic of Research

Households with limited income always measure their socio-economic capabilities and try to live within their limits. As an example, a low income household may live in a poor house or apartment, while a rich one may live in a villa with a swimming pool. On the other hand, have governments and decision makers given them all the same opportunities? In Al-Madinah, building regulations were set 25 years ago. On the other hand, size of REDF loans, which is for dwelling development are still the same amount, and time to wait for them is more than 14 years. Rich people who own land can apply for loans before others. They can buy the best plots that are completely serviced and develop them, either for their own residency or for investment. Despite the long queue for REDF loans, poor people can not apply for loans if they do not own a plot. If they do own plots, they are located far from the city centre and have usually not been serviced yet. Such plots were either granted to them by the Municipality or bought from their limited savings at affordable prices. As a result, rich people mostly own developed plots in central Madinah. In contrast, poor ones live as tenants in serviced districts, or own dwellings in far districts and are deprived of some services or amenities.
Chapter Four: Research Methodology

Regarding the population growth in Al-Madinah, vast developments grew in the far fringes as new approved grant or private plans. Scattered development is the resulting urban form. Yet, urban policies and building regulations dictate Al-Madinah residents live within a limited size and quality of residential unit and type of neighbourhood units, and have expensive services and amenities. It is true when Hamlin states that governmental economic policies impact individuals and their daily lives (Hamlin 1997). He continues by saying that a topic might be only a departure point for a more specific interest of research in depth.

To tackle such a topic of research, and before designing the questionnaire, measures should be set and clearly categorized for each part and dimension of the socio-economic and psychological characteristic of households, their dwelling and neighbourhoods. A hypothesis must be refined and formulated for analysis. Allocation of exact data and methods for analysis are essentials for developing the theory (Scott 1997). Measuring and weighting of data needed for research are in two types of data to be collected and organized before conducting the field trip. Measurements are carefully designed and planned before and during the research process to have enough validity and reliability (Peil 1982). They are categorized to either quantitative or qualitative data. Both types are detailed as shown below. Both types are to be classified as one of four measurements. They are nominal; ordinal; interval; and ratio (Pedhazur and Schmelkin 1991).

- **Nominal** measurements are such as those listed in data as labels for class or status. Nominal measures clarify the class of an object. In general it means that case $A$ distinctly differs from case $B$. However, it does not mean that $A$ is greater or smaller than $B$. Examples for this are: marital status, nationality, district's name and questions that require the answer yes or no.

- Ordinal measures show the rank of a sample within an order or status in attribute. Examples are educational status, and all satisfaction questions. So it can be said $X$ is higher than $Y$ in education or simply $X > Y$.

- An Interval measure is an ordinal with exact measured interpreting of orders within attribute. A constant unit of measurement is used. Groups of income or age are examples. But age is a question here because the questionnaire is for a household dwelling not for individuals.

- Ratio: this measure is an ordinal interval and with constant ratios between measured units. Here it is possible to say that $A$ is double that of $B$, when $A$ is from scale 2 and $B$
from scale 1. An example here is as if the weight of a product is categorized into groups of packs of 5, 10, 15, or 20 KG. None of the questions is set in this form of measure.

These indicators, especially the first three, are mostly used in the questionnaire. In general they give substantive details of the social economic characteristics of Al-Madinah residents as shown in the research in chapters: 6, 7, and 8. Quality of research is based on the qualities of these measures above and shown below in the questionnaire design (Pedhazur and Schmelkin 1991).

4.4 Research design

Methodology of research can be simplified as shown below in Figure no: 4.1. After setting the aims and objectives of the research hypothesis, as shown before in Chapter One, a literature review is undertaken in Chapter Two, to highlight the problem in Al-Madinah building regulations with regard to their socio-economic characteristics. Research design here differs from research structure in chapter one and content of each chapters. It is about designing methodology from available literature and data, data collections, entry, analysis and conclusions of results.

There are two reasons for searching the literature. The first is to increase knowledge of related researches, books, reviews, papers, articles, official reports, statistics and theories. The second is to understand previous methodologies used. Evaluating this literature can lead to new views, methodologies and solutions. The research will either find results that support previous literature and increase knowledge or it will criticise them because they are faulty, and therefore add a new discovery to the field. Both reasons give ideas about data collection methods. Moreover, old frames and approaches to the topic can be reviewed by reading previous literature. Hart quotes five reasons why literature is important for a researcher. They are: to know what work has already been done; to avoid duplication of research or its methodology; to avoid mistakes captured in previous works; to allocate your personal methodology, framework and data collection methods and understand the gaps in existing research in order to choose the best research area and topic (Hart 2001). A quick search was done in Chapter Two but each chapter has its own literature review as stated by Hart (2001) that continuous reviews of the literature for a topic can increase breadth and depth of research.

As shown in the figure below, the literature review is connected to most of the methodology and research framework. Investigation of the actual data was essential
because statistics and census data were not updated at the time of the start of the research. Each step in the methodology is detailed below. The methodology here is answering the question ‘How?’ It shows research design, sampling, data collection and the field trip to Al-Madinah, data entry and coding, and analysis as shown below in detail. Moreover, it draws an outline of the research. Primary research was conducted with households as residents of residential units, and as neighbours in neighbourhoods. It is very useful in terms of getting actual measurements for the real built environment in Al-Madinah (Peterson 2000). All data collected, entered, analyzed and figured are evidences for the contribution of this research to the field of neighbourhood planning.
Figure No. 4.1: Research methodology
4.5 Questionnaire Design and Data

Previous research about Al-Madinah housing was done by Al-Harrbi (1998). Therefore, the questionnaire used by Al-Harrbi has been revised questions relevant to this research were chosen. This does not mean that this is a copy of that research but a continuity of research for Al-Madinah building regulations. Al-Harrbi looks for satisfaction among Pilgrims housing and built environment and their life during their short time stay in Al-Madinah. In contrast, this research looks to resident satisfaction with their dwellings and their whole life as citizens. Moreover, it looks to reform the process of neighbourhood planning and re-adjusts building regulations to fit actual socio-economic characteristics of Al-Madinah households. The aim here is to reduce costs of plot ownership, building, furnishing, and future extension. In addition it is to propose huge saving in governmental expenditure for infrastructure networks in terms of neo-traditional planning.

The design of the questionnaire is based on both methods of data collection. The first is direct contact, and the second involves leaving the questionnaire with people to fill in their views up to their own time. This is because of the time limits of the field trip, which is explained below. Questions should be as short and simple as possible. A tick form for multi-choice questions is the easiest to fill in. Only a few questions required numbers for accuracy. Thus, the researcher first explained that these questions are only for research purposes, and all data and information is confidential. It is also explained that a name is optional only for quotations in term of good comments or argument in issues of research. This was an important part of data collection in terms of increasing the response rate. A few questions were asked twice in different ways to improve recall of the respondent’s memory (Floyd and Flower 1995). Questions on the type of dwelling are examples, especially for those not interviewed directly.

The researcher then classified data needed for research. Flexibility was left in few questions, therefore, writing the name is optional and indicated in a letter attached to the questionnaire. Other questions have also been avoided, examples include the number of females in households, or exact income. Income grouping was best asked in the form of a tick box. Such questions are very sensitive ones in Saudi culture in general, and specifically in Al-Madinah. Al-Madinah people are mostly conservative. But not as it is the case in Jeddah. Therefore, questions need to be easy to respond to. Moreover, they need to provide accurate information for the researcher. These information about
measures of spaces those fit residents’ needs will be considered to calculate of the satisfied size of dwelling by residents, and consequently the size of neighbourhood unit (Czaja and Blair, 1996). The researcher set exact questions in the questionnaire to test the respondent.

Most questions are related to personal data or personal views. Therefore there are no questions about other views or general statistics, which are unknown to most people. Only questions which they know and can relate to them, their views and their claims are set. Even then, personal judgments are set in different categories to offer more answers and options to select from in the questionnaire. Finally, a space is left for any extra views or comments about the questionnaire or related issues to be written at the end. In all, the information the researcher seeks to gain is classified into five categories as follows:

4.5.1 Personal data (household’s socio economic data)

This data is chosen so the questionnaire will include a variety of socio-economic data about households in Al-Madinah and changes since the last census in 1991. These personal questions are as follows: size of household, its monthly income range, nationality, marital status, employment status, level of educational qualifications, domestic workers in dwelling, other employment in households, ownership of plot or dwelling, where he or she got it from, where it is located, area, dimensions and street width. These questions are about the household’s social and economic characteristics in Al-Madinah. Questions about an individual’s characteristics such as age are avoided (Peil 1982). Otherwise all others are so assumed as absolute properties such as income, and education level. They are important in terms of the relationship with housing policies and building regulations as they affect their choices of dwellings and neighbourhoods. Rather than supporting the research hypothesis, they represent the actual sizes, income groups, their cultural qualities and their employment ratios; they summarise what the household thinks should be taken into consideration in urban planning, at least in the near future. This data is used in chapter two for urban growth of Al-Madinah and population characteristics. In chapters five, six and seven, they are used in analysis to examine the relationship with other characters. Furthermore, they examine the household’s satisfaction with regard to their dwellings, locations within neighbourhoods of Al-Madinah, the dwelling quality and dwelling quantity.
4.5.2 Data of Building Regulations

While earlier sections targeted personal data about socio-economic characteristics of households, this section tends to investigate building regulations and policies. Nevertheless, it looks deeper into areas and details of housing through various urban patterns. Questions regarding contemporary dwellings and their measures are asked. Measures include not only the area of the plot and total building area for the dwellings, but are concerned with areas and numbers of rooms, kitchen, toilet, courtyard and garage. Furthermore, questions about the process of permit applications for building, and building ratios for area of the plot were also included. None the less, questions about personal needs of future home measures are also asked. Questions about building materials are included to specify common types of materials currently used. This will be related to the cost of construction later. One of the basic assumptions for the research is that building regulations affect costs over all three levels (Peil 1982). At the individual level it affects land sale and development. In the neighbourhood level, it affects deprivation of amenities. At city level, it affects governmental expenditure on infrastructure networks for services. These questions in all are to measure exact sizes of actual dwellings whether they are owned or rented. In general people tend to reside in dwellings that are a suitable for them in terms of size and their income, even if the quality is less than they require. Yet, Abo Bandar (2001) states during interviewing that:

'Rent is too expensive, so that I'm living in a flat of my father's house, but if I go out and looked for those flat are enough for my family, rent wont be less than 20000 SR, which is too high regarding my income'.

Other evidence from surveys and interviews will be shown in later chapters.

From all of these questions, averages of areas for rooms, kitchen, toilets, and others, areas and numbers will be summed to gain the average size of a dwelling unit for such an income group of people, for example those earning less than SR 10,000. Consequently, this resulted size of dwelling unit consequently will determines the size of plot to be considered during the process of subdivision in future neighbourhood planning. Most of these questions supply the main data for forming chapter six which deals with quantity of dwellings in Al-Madinah.
4.5.3 Financial Data

Examples of these questions are: cost of dwelling construction, cost of furnishing, loans affordability, source of loan, size of loan, interest rate, repayment installments, difficulty of non-payers and satisfaction levels regarding these issues. In all they are related to difficulties experienced by people who cannot afford to own or rent an adequate dwelling. One of the interviewees who resides in one bedroom apartment felt shame at living there as a teacher who earns SR 6,000. Yet, he withheld his name on questionnaire states the following:

My salary is about SR 6,000. Only SR 2,500 remains after paying my debits payments. This amount remains for flat's rent, and life with it, how I don't know?? The rest are debits of marriage costs and it will finish after a year. Yes the loan includes interest rate and very high one. But I had to do this to get married, where no one else will give me money. So that I bought cars by loans and then sold them for cash. Indeed I'm trying to payback all the money and won't do it ever again.²

Others argue that financial policies for housing and development are not suitable for those on low income³. Developers state they are targeting high income groups to pay monthly over SR 7,000 to cover the cost of building the dwelling within 10 years. Yet these questions show the reasons why cost of rent, construction, furnishing, and land prices are high. In most cases building regulations and wasteful measures are the main reasons. Moreover, it may provide guidance for future developers to manage to build affordable dwellings to fit people's needs in relation to their social and economic characteristics.

4.5.4 Housing Data (type and quality of housing units for chapter 7)

Questions about the type of dwelling, tenure, and length of residence are essentials for allocating dwelling quality. Moreover, questions relating to residents satisfaction with dwellings and the building are important for data analysis regarding regulations as cost of developments is very expensive for low income groups and young families. Expensive costs are noted in terms of construction regarding materials, methods and future maintenance. Such questions form chapter seven, which deals with the quality of dwellings in Al-Madinah. It is the chapter that research goes deep inside the dwellings,

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² Questionnaire no 249
³ From questionnaire and interviews (Al-Ahmedy, Al-Harbi, Al-Mezainy, Al-Shareef, Bakr, Faiydi, Mohammed, Niazi, and Omer, 2001, Field survey)
rooms, and people who are living there. Thus it is very important to assess their satisfaction with the quality of the dwelling they live in. Chapter Seven shows this in more detail and how answers to such questions have led, after analysis, to quality information on Al-Madinah’s contemporary dwellings.

4.5.5 Satisfaction data (Housing Unit, Neighbourhood, and Services and amenities for both chapters 6 & 8)

First, questions related to residents' satisfaction with contemporary dwellings are set to assess the level of satisfaction with the size and number of each room, space, windows, entrances, set-back and garage. Then, questions about the buildings that include dwellings are asked. Furthermore, questions about satisfaction levels regarding the built environment in general and in specific terms of services, utilities, and amenities within neighbourhoods of Al-Madinah are asked. Open space or a courtyard is an amenity which is very important for residents. Shehatah, who is a planner and friend of the researcher, said in informal interview:

'I’m working now in Al-Aqeeq Municipality which locates in north of Al-Madinah, and live in the housing project which is in the east. It is totally different, and I’m a tenant of one villa there. The rent is nearly the same as for apartments locate near my work, but the courtyard is very important to my children. Yes, it is far from work, but I am very satisfied for daily life with family'. 2001

In social science research, satisfaction questions strengthen general opinions and arguments. These are not the researcher’s own views but the views of a part of society. This is a part of the privilege of this research in terms of its objectivity (May 1996). Thus, chapters six, seven, and eight are based on data analyzed from the satisfaction questions, which reflect resident’s thoughts and points of view regarding their built environment.

4.5.6 General Comments

Interviews were conducted with those directly related to the urban planning process. These took place by open speech with the relevant people with the researcher giving hints about the topics he wished to discuss. Architects, planners, engineers and drawing men were interviewed in the Municipality. The researcher also interviewed managers, engineers, architects, planners, surveyors, technicians, teachers and employees working in services and utility bodies. In addition real estate agents were interviewed either in
their offices or in their own cars in new planned areas. Such quotes, points of views and comments are used in later chapters as evidence to support arguments and the result stemming from the research.

Lastly, at the end of the questionnaire, a space was left in case the interviewee wished to make any comments about or issues in the questionnaire or any topic related to dwellings and the planning permission process. Such comments are used as evidence by the author in most chapters for the all issues included and to support his arguments. Some of such comments were interpreted to give support answers for those questions been asked at first chapter. The questionnaire is thought of as a valued process for achieving something better for Al-Madinah. Many people asked God to help the author to succeed in his research regarding the aims he seeks. The author avoided writing such comments in direct interviews he undertook but those who had questionnaires and filled them in themselves wrote what they hoped regarding their agreement to questioning by the author about critical points related to their life.

Such an area is also a way to avoid wasting time and losing control during a direct interview. The author always informed interviewees that there was a section in which to write their claims and point of views when he felt interviewees wished to talk about things not related to the point. Some comments are very valuable and provide strong evidence for the author to prove his hypothesis. Even if those comments are from public observations, they are still good alternatives and solutions from local people to their own built environment. An example is a comment made by Mr. Hashim, who is a teacher. He said that there are no other alternatives for building materials. The contemporary materials cost a lot, and if there are cheaper ones, this would help low income groups to build on the plot they have. Thus May states:

> Participant observers may work in teams, which assists in sharpening insights and generating ideas. More often, however, researchers work alone. In the process they witness the 'reflexive rationalization' of conduct that is the continual interpretation and application of new knowledge by people'. (May 1996)

Such observations have more flexibility. Moreover, they form ethnographical data and an early draft for theoretical ideas, critics, analysis, and sometimes facts.

After the questionnaire was designed and completed in Arabic, it was translated into English as it is shown in appendix. A very simple pilot study was conducted with relatives and friends who do not know about the field of planning. A few comments
were considered in terms of spelling, editing and the process of questioning. All this was done before the start of the field work. A typical copy of a questionnaire in Arabic and a plain copy in English are enclosed within the appendix. It consists of ten pages. The first is an introductory page explaining what it is about. The rest are questions for the researcher interested in this piece of work. A hundred and forty eight questions are included. Thus, the sample size seems small. Questions in the first third are ethnographic, building regulations, dwelling measures, dwelling types and ownership, about permit procedures, and finance issues. The other two thirds are about satisfaction levels as mentioned above.

4.6 Sampling

Theoretically, sampling is the selection of quite small groups of units to estimate characteristics of a society or a population of an exact place. The population here is a set of units these samples are meant to represent. Units are components or members who form the population and the analysis is based on them. A sample is a group of units which we select and collect information about as being representative of the population (Peil 1982; DeVaus 2001). The research goal is always to generalize a statement or conclusion for a large population using a small sample. Thus, researchers for marketing companies always make useful estimations about 59 million adults in the UK using small samples of between 1000-2000 individuals (Fielding and Gilbert 2000). But it is very important that selected samples are representative of the total population. In other words, limiting the Sampling frame is what determines the scope of the population (Peil 1982). A representative sample is one that has the same profile of the population. Otherwise, the research will be flawed as Black states;

'For research purposes, they must be defined by the author of any report or article...It is up to researcher to identify and describe adequately the population to which the results are intended to apply and, like any other aspects of research, any such claim must be justified'. (Black 1993): 43

This goal may be gained by two main concepts of sampling techniques:

a) Replication: where most participants here are not chosen by statistical representative method of sampling. Thus, repeating experiments will test the generalising of results. Then, if results are repeated, we can have more confidence in
generalizing them. These types of generalisation are mostly used in scientific and experimental fields of research.

b) **Statistical generalisation:** where probability theory gives us a wider range of confidence when we conclude characteristics of small groups (samples) and these characteristics are in the large group (population). Statistical samples here have an equal probability to be chosen as a representative sample in a random way.

In general, sampling may be divided into two main types.

### 4.6.1 Non-probability sampling

It is much cheaper and easier. Non-probability techniques are preferred when the sampling frames are unavailable, the population size is too large or when the researcher is interested in showing ratio of respondents. These techniques, as stated by both Peil and DeVaus (1982; 2001), are as follows:

- **Purposive sample** where a researcher may choose those traits which may not identify all characteristics or variables, and may have a biased selection such as choosing leaders of groups to gain useful information. Such sampling is only for official interviews with those who deal with urban planning process in the Municipality and infrastructure organizations and agencies.

- **Quota Sample:** selected samples here have particular characteristics to fit the exact criteria of researcher. The final samples should be representative ones but not especial cases. Thus, those households who are living in a dwelling on the first floor are chosen. While ground floor dwellings are always rented ones, owners may reside in the upper one. Choosing the first flat at first floor level is more accurate in showing the real ratio of tenants and owners within the society of Al-Madinah.

- **Availability samples** are those used for exact purposes where anyone who wishes to answer may participate in the survey. Newspapers and web surveys are examples of this technique but are the least likely to get representative samples. Both methods of using the internet or post for questionnaires are avoided in this research. In samples visited by time table were not at home, then only one other visit was done at a later time, and after that next door was the option.
4.6.2 Probability samples

Sampling can be outlined as four main techniques. Each one is related to the nature of the research problem, limitation of sampling frames, fund, level of accuracy required, and methodology of data collection. They are, as has been stated by (DeVaus 2001) and (Peil 1982), as follows:

- **Simple random samples** (SRS), where cases are selected randomly from the population at required numbers. This requires a very good sampling frame, it is mostly appropriate when the population is geographically limited and data collection does not require travel over long distances. Al-Madinah is not that big and it is the city of origin for the researcher, yet it is easy for him to manage using a car between districts.

- **Systematic Samples**, this is the same as SRS but after the first sample selection will follow the systematic method such as ‘every seventh unit after’ or circular frame. So, it requires in some cases to mix up the samples or use SRS to avoid systematic exclusion. This technique is the one used in sampling for interviews with questionnaires. Sampling was done on a manual map because of ease of managing and marking. Systematic sampling changed between areas of high rise buildings and two floored buildings within the Second Ring Road and outside.

- **Stratified sample**, this is a revised SRS to gain more representative and accurate samples. The population here is divided into groups regarding such characteristics or considerations as density, ratio, ethnicity, building height, pattern of urban form, or location.

- **Multistage cluster sample**, is used when there is no sampling frame for the population of the city. This technique is used in testing the measurements of neighbourhood plans, and in dwelling’s designs. The technique for digital maps using GIS is as follows:

  1. Digital maps of Al-Madinah show where informal areas and newly planned areas are located. Few samples are chosen for each pattern of urban land (either informal or planned) to be analysed using ArcView, and ArcGIS.

  2. Each selected map is calculated with regard to its total area, net residential area, and length of roads. The size of sample here is not that important because the main ratio is calculated to 10,000 m² (Hectare).

  3. Random sampling n% from those sub-maps.

  4. SRS or stratified sub-maps are the final samples which have categories of planned, informal, vacant and planned empty plots.
5. Those plots will be tested in terms of their numbers within a hectare and consequently their areas.

6. Pattern of subdivision is also a key issue in measuring the difference between scenarios.

All final samples have to be of a size which guarantees 95% accuracy. Thus, it is important to determine the sample size required for that range of accuracy.

4.7 Sample Size

Black (1993) points out:

'A research report should describe the size of the sample, ....there will be some error, which will be dependent upon the size of the sample, ...the smaller the sample, the greater the error and vice versa...It is to the researcher's benefit to have as large a sample as resources will allow.'

Thus, sample size relies on two factors:

1. Level of accuracy

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2. Key characteristics of the research (less questions with large sample size and vice versa)

The decision is left to the researcher to allocate the confidence he/she wants to have in generalisation of samples of the population. Thus, sampling error and confidence interval are very helpful in the researcher’s generalisation. They are not the only factors as sample size, cost, time and access to respondents are also to be considered (DeVaus 2001).

Table 4.1: Sample size and confidence interval

<table>
<thead>
<tr>
<th>Year of Pop.</th>
<th>Pop. Size</th>
<th>2%</th>
<th>4%</th>
<th>6%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>405,000</td>
<td>2387</td>
<td>599</td>
<td>267</td>
</tr>
<tr>
<td>1992</td>
<td>608,000</td>
<td>2392</td>
<td>600</td>
<td>267</td>
</tr>
<tr>
<td>2000</td>
<td>1,378,870</td>
<td>2397</td>
<td>600</td>
<td>267</td>
</tr>
</tbody>
</table>

Entered size of population using website: *surveysystem.com* (2001)

Therefore, it is a very complicated process. A website dealing with surveying and sampling which is called *surveysystem.com* offers a ‘Determine Sample Size’ calculator to specify the right sample size with different scenarios of confidence levels (95% and 99%) and confidence intervals (2%, 4%, and 6%). The results for Al-Madinah samples are as follows:

<table>
<thead>
<tr>
<th>Confidence Interval with 2%, 4%, and 6%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confidence level set at 95%</td>
</tr>
</tbody>
</table>

Note that population size should be number of households

Moreover, confidence intervals (sample errors) according to sample size of questionnaires (267 samples) related to a population size of 1,378,870 in 2000, and 50% variation are as follows:

Table 4.2: Confidence level and sample error

<table>
<thead>
<tr>
<th>Confidence Level</th>
<th>85%</th>
<th>90%</th>
<th>95%</th>
<th>99%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Error</td>
<td>0.6%</td>
<td>0.7%</td>
<td>0.8%</td>
<td>1.1%</td>
</tr>
</tbody>
</table>

Moreover, even when using the population size of the households which is equal to subdividing the total population size by size of households (Population. /size of households), the result of the sample size is the same at 267.

Thus, it is pointed out:

"The larger your sample, the more sure you can be that their answers truly reflect the population. This indicates that for a given confidence level, the larger your sample size the smaller your confidence interval. However, relationship is not linear." (www.surveysystem.com/sscalc.htm, 28-May-2002)

4.8 Field survey and data collection

4.8.1 Introduction

Data collection is a major part of any social research. Ethnography is a part of social research which needs direct contact, whether using a formal or informal interview. The researcher collected data from various resources, most were in Al-Madinah the study area. The rest were from Saudi Arabia, and electronic resources. Data collection in Saudi Arabia is very restricted, the author is used to such procedures as he was an undergraduate student at College of Architecture and Planning, King Saud University, Riyadh, and after he became a teaching assistant at the Department of Urban and Regional Planning, School of Environmental Designs, Jeddah, the procedures were the same. Thus, an official permit form from King Abdul Aziz University was essential for the researcher to start the data collection process. A permit is a letter from the University for the Government and related organizations who may be contacted to help the researcher in providing him with the data needed. Another process the researcher undertook was to advertise in the School of Environmental Designs, KAU, Jeddah, for students who would like to do interviews during the summer holiday for SR 1,000. Four students from year five registered their names. This was good news for the author, because he planned to do interviews with the Municipality staff who dealt with the urban planning process and procedures, and the students would do most of the questionnaires which would be checked by the author every week. The estimation that the survey would be finished in six weeks appeared to present no difficulties. But, in Al-Madinah, difficulties started to appear.
4.8.2 Data collection difficulties:
The researcher printed 500 copies of questionnaires. The size of sample was allocated at 267, but more were printed in case of mistakes, unreturned copies, or false data from those who do not care about research and social work. The difficulties were as follows:

- Only two of the five registered students came for training to do interviewing. One of them withdrew in the first time of training, when the researcher mentioned that data accuracy would be checked from Health data files. The second continued and got 100 samples in the south of Al-Madinah. Then he called and said that it is a very difficult job, and people did not trust him nor respond. The reason for this was his age, people are very suspicious of young single males knocking on their doors to be allowed to enter, or even to come again to collect questionnaires. He never returned or sent back copies of the questionnaires.

- When an electronic questionnaire was held on a website (Raddadi 1999-2005) to investigate the social customs of Saudis with regard to an unknown visitor who came to the house with no appointment when the dweller has planned to go out, the answers set were; cancel plans and sit with guest; explain that I’m going out now; or ignore him and do not open the door. Percentages were consequently 58%, 23.3%, and 18.7%. However the author avoided meeting those in the last 18.7% (who said ignore him and do not open the door) and decided to find time appropriate for people to have a short interview.

- The researcher then decided to do it personally in the evening, between 5 and 9 pm during week days. This timing was for many reasons. First, he was making official contacts with professionals and staff in governmental and infrastructure bodies. Second, most leaders of households will be at work, and it is socially unacceptable to knock on doors while they are out and their families are alone at home. Weekends are the best time for family life and recreation, visiting, parties and shopping, and it is not acceptable for people to spend time in interviews and filling in questionnaires. This is also the case for the researcher and his family, who lived abroad for a while and needed time for a social life during weekends. So between 5 and 9 was best because it is the appropriate time after families have had their prayer, and before they get ready to sleep for the next day at school and work. It is however, a short time period in which to interview.
• Social customs and traditions of hospitality from residents are to be expected during the visit so more time was spent going through the hospitality. It is morally very difficult to enter a house and reject any Arabic coffee and dates offered. Sometimes they insist one stays for dinner. Therefore, an allocated time of 15 minutes for filling in one questionnaire then takes between 40 – 75 minutes. The field trip had to be extended another two months over the planned three months period.

• Because of hospitality, adequate time for residents, and prayer times for Maghrib ‘Sun set time’, and I’sha ‘Night or dinner time’, it was possible to visit only three houses daily to collect data for questionnaires. At an average of an hour per visit, the total time spent was 300 hours. Undertaking three questionnaires daily only on weekdays meant 100 days, or 20 weeks. The researcher spent five months in data collection. The majority of those left with residents to fill by themselves had errors and were uncompleted. Yet the researcher did not get what he expected.

• In a few cases of official interviews, even with an official letter for easy data collection, some people in certain positions tried to show their power and control and tried to redirect and delay the process. On the other hand, plenty were very helpful, especially the mayor of Al-Madinah who ordered the researcher be given digital maps for free. Such maps cost £4000 for private users or consultants.

• During the field trip to Al-Madinah for data collection only 224 questionnaires samples were completed. The other 43 samples were completed two months later when the researcher took a holiday and worked through the interviews to finish the rest of the samples. They were targeted to two areas which were seen by the researcher to have fair sample sizes. These areas were planned areas including the Housing Project in the east of Al-Madinah, and informal areas. Data collection was important not only for questionnaires, but also for other sorts of data as it comes in different forms; such as maps, books, small researches, interviews, pictures and questionnaires.

4.8.3 Interviews and comments (types, selection)
The researcher conducted direct interviews and filled in the questionnaire personally, or left a questionnaire with blank space at the end for others to fill in at the appropriate time. Not all of them were filled personally and people were chosen from those who seemed to welcome filling in a questionnaire personally. If the researcher was not welcome then the next dwelling became the sample and so on. In the case that the head of household was busy and requested another time, then another time was set for
interviewing. Informal interviews were set by the researcher who always opened the talk on such topics and issues in the questionnaire with people to raise their perceptions and arguments, as mentioned before in any parties or social gatherings when he was on the field trip (May 1996). Interviewing can source the validity of data from those practicing urban regulations, or planning activity and its process. Nevertheless, it allows accessibility to unknown past events and reasoning to give more qualitative observations (Scott 1997). Interviews were conducted with those dealing with planning issues, building regulations and infrastructure networks and were important for the researcher to test co-operation between different governmental bodies, services, and utilities firms in terms of new neighbourhood planning. Important comments were written and persons informed that their comments may be quoted and their names may be referred to. Yet, if they agreed then names will appear in comments otherwise they withhold their names and only number of questionnaire will be shown. They were as follows:

- Planners (Municipality, consultants, and developers)
- Architects (Municipality, Saudi Telecom, Education Sector, consultants, and Electricity company)
- Engineers (Municipality, Saudi Telecom, Education Sector, Electricity company, Intendance of Water and sewage, and consultants)
- Real Estate agents, and manager of Real Estate Development Fund
- Contractors for development, constructions and pavements of roads

All valued comments and views were translated from Arabic and entered in Endnote software as part of the bibliography in separate files for direct quotation.

4.8.4 Digital Maps

Al-Madinah urban area is covered by 107 maps in CAD format. Each one of them was entered separately in ArcView and reformatted as ArcView/ GIS format using shapefile after choosing the right layers needed to show only buildings, roads, parking, vacant lands, farms, mountains and valleys. Each map had 65 layers of drawings to show the huge amount of data on a digital base map as shown below in Figure (4.3). Editing the map format requires reading data in ArcView then editing the format to be manipulated in ArcView for data analysis in the next chapters. However, preparing digital data ‘maps’ to be compatible data in ‘thematic maps’ with ArcView (version 3.2) requires the process to be done separately for each of the 107 maps.
Figure 4.3: Digital map in CAD format and full of data such as frame, coordinate network, land use references, symbols and topographic lines.

The process is shown below:

- **Open ArcView**

At this stage do not open new view until (File/Extension/) is ticked and then tick CAD reader. Open new View and it will be shown as view1 or view2 as required.

- **Add new theme**

By clicking add data button (shown in the figure below) a window for add theme will appear to allocate the source of the data to be added. Adding maps in CAD format (GX no.dgn) to ArcView is a normal process, it as the same as choosing any file from drive/folder/file/map. By choosing the map and pressing ‘ok’ it will be added to the view as shown.
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Large and detailed data will be shown. Some maps have layers from 0-64, others have some, and the rest have very limited layers. Once it is shown on the left side of the view, tick the small square which allows the map to be shown as below in figure (4.5).

Figure 4.4: Adding theme ‘map’ from CAD digital maps to View in ArcView

Figure 4.5: Adding map as a theme on view
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- Choosing required data

Choosing data from the map shown can be done by using the 'Query builder' tool that is shown as a hammer icon at the top tools bar. But before using the "query builder" tool, the identifying tool is to be used first. This tool can show all fields and values of any data in the map or theme if the map is selected and then the "I" icon on the tools bar at the top of the ArcView window is selected. Nonetheless, "zoom in" which is shown as a magnifying glass on the tool bar, can be used for zooming in to choose data and then identify each layer for all data in the theme as show below in Figure 4.6.

After recording layers that are needed and those which are not, a query builder tool can be used then. The legend table is shown in red on the bottom of the map in Figure 4.7. By clicking on query builder, a new window will appear with fields of data on the left side, and the value of each field on the right side. Between them there are mathematical operations that may be used for data selection or exclusion by their field and exact values. On the bottom of the "query builder" box there is a blank area with a function for choosing or excluding data. By ticking the box for 'update values' and then clicking on the field to choose from, values available on the map will appear directly. After checking layers needed for subdivision maps, only 11 layers are required. They are: 3, 6, 8, 12, 15, 18, 22, 23, 24, and 52. Choosing these layers to be only shown in maps requires the use of the function or criteria as shown below:

\[
([\text{Layer}] = "3") \text{ or } ([\text{Layer}] = "6") \text{ or } ([\text{Layer}] = "12") \text{ or } ([\text{Layer}] = "15") \text{ or } ([\text{Layer}] = "18") \text{ or } ([\text{Layer}] = "22") \text{ or } ([\text{Layer}] = "23") \text{ or } ([\text{Layer}] = "24") \text{ or } ([\text{Layer}] = "52")
\]

Function can be added to the blank field by writing or double clicking on layer on field; or click on function (=, <, >, or, and, not); and double click on the values needed of those filed, in this case values of layer. The figure below shows this clearly. By pressing on the “New Set” button on the upper shown figure ArcView will highlight the chosen data from the map. This is the result of query builder choosing or excluding data using function or criteria.
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Figure 4.6: Identify layers to choose the required data from base maps before using "query builder" tool; use after zoom in to avoid misidentification between adjacent lines

Figure 4.7: Query builder tool and choose required data or exclude unwanted ones by query criteria

- Shapefile tool and Reformat CAD data to ArcView data

Using Shapefile tool in the theme function on the tool bar will divert format data from CAD to ArcView one, as shown below in Figure 4.8. ArcView software will download
the new data and will require the drive/folder/file name to be saved in; otherwise it will be saved in a temporary folder. Then, it will ask whether to add a new theme to the same view or a new view. By clicking ok, a new view will be added and named as it was during the process of Shapefile. Ticking the small box for the new theme will produce the map shown below in Figure 4.9. The old theme with CAD format can be deleted using the Edit/ delete theme from the tools bar, but this requires that this theme be clicked once on the legend bar in the view as shown below.

Figure 4.8: Tool of shape file and converting data to ArcView format with chosen criteria

Figure 4.9: Shapefile tool: converted map from CAD's format to ArcView one is added as a new theme to view over the old data
- Editing and specifying legend of the new shaped file map

The new shaped file map is shown after the addition in single colour. To show all layers in different colours the "Legend Editor" tool is to be used. This tool can be shown by double clicking on the legend of the new map. For a better appearance, it should be used after zooming in to show the contrast of colour within the scale of the dwellings. In the legend editor window, using unique value in ‘legend type’ and layer in ‘values field’, the available layers in the map will be shown in different colours, each one for a unique layer. To change the colour of such layers, double click on the colour of the layer to be changed. Then, a small colour ballet will be shown to choose from, or press on custom to specify the colour with its three components to be unified for all other maps for such a layer. Figure 4.10 below shows how to specify the colour of plot boundary lines in pink regarding to its Hue, Saturation, and Value. By doing the same for other layers of the shaped file map, the new theme ‘map’ will look as shown below in Figure 3.11 as a final map that shows subdivision lines, building lines, road network, etc. The colours set by default of ArcView are not always the best, yet choosing the best representative ones is the research choice to present the final base map in the proper form. The layer that has been changed in all the 107 maps is layer 23. It has been edited to black to show street lines as shown in Figure: 3.11, and in Figure 3.12.

Figure: 4.10: Legend editing and coding the colour of layers
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Adding all themes and shape filing them to form the Al-Madinah Map

By doing the same process for all 107 digital maps, the primary base map for Al-Madinah will be as shown below in Figure 4.12. However this does not include the updating to 2005.

Many maps were produced for final analysis using ArcView and ArcGIS for both patterns of areas whether informal areas, or new planned areas. The analysis is in terms of network length and consequently costs of provision of infrastructure networks but not including the construction and maintenance costs. Methods as shown below are a guide for future planners in how to use GIS capabilities, not only for recording and storing data related to plots within plot based databases, but more to evaluate neighbourhood planning in the early stages to examine its infrastructure costs and its physical design and measures to enable implementation of the model proposed by these. Examples from both planned and informal areas are chosen randomly from different patterns of subdivision to show the methodology that future planners can follow to check any neighbourhood plan before it is approved.
Moreover, it shows how expensive contemporary plans are in terms of infrastructure networks and how much saving can be made in case of the implementation of the proposed model of the neotraditional neighbourhood of Al-Madinah.

- **Updating digital maps**

Digital maps granted by Al-Madinah Municipality were current up to 2001 when the researcher applied to get a copy for his study. But by 2005 they updated the digital maps and published them on the internet via the website (http://www.amanamd.gov.sa/Madinaexp/). The researcher sought to update these maps when he started his research final writing in 2006. The digitized maps are shown in explorer to allocated accurate areas, which are very important to his final conclusions and recommendations for de-fragmentation of urban space in Al-Madinah.
Main roads should be very clear to give more accurate positioning of any analysis. Yet all main roads sourced from new data from Al-Madinah and mentioned above are digitized to show final roads map for 2006, the figure above shows this clearly. However, other updating is essential for further analysis; yet planned areas and extended urban lands are updated digitally by author as shown below in figure 4.14. Moreover, he classifies patterns of urban lands as shown below into three main categories. Planned lands, informal lands (including the transitional ones), and vacant lands. Calculation of area was a difficulty in ArcView, neither the researcher nor his co-supervisor solved this, but the co-supervisor asked another PhD student to be involved in such issue, but even though he could not. Problem was sought as in installation of ArcView version. Yet, the researcher converted updated maps to Arc/GIS which deals with files of database in ArcCatalog that calculates areas of each
pattern and gives a final forecast for future consumption or saving after de-frAGMENTATION of urban space, as will be shown in the last chapter. The map below shows final maps after updating with three main land patterns, central areas, major roads, major farms and mountains.

Figure 4.14: Final base map after updating by manual digitizing by author
Updated regarding to aerial photos from Al-Madinah Municipality and regarding to aerial photos its website (http://www.amana-md.gov.sa/Madinaexp

Each type of land use was updated manually and digitized by the author since the start of 2006. Old digital maps sourced in 2001 do not cover all the areas, new roads, farms, and holy zone. But after finishing all the digitizing, the base map now finally is as shown above.

- Export data from Shapefile of ArcView to ArcCatalog

This procedure is to be applied to any theme in shape file of ArcView that is needed for further analysis in ArcGIS (ArcMap). Yet, all updated themes shown in the above Figure are exported to geodatabase in ArcCatalog. After choosing the name for the new geodatabase (an example is ‘informal’), change of setting should be done. This process is to use the exact coordinate system that is used for other themes. To change the spatial references of the geographic coordinate system one must be chosen from the list.
The figures below show the process of exporting Shapefile from ArcView to ArcCatalog, and then getting the analysis and statistics in ArcMap in sequences.

Figure 4.15: Using ArcCatalog to export Shapefile of ArcView theme to Geodatabase to be used in ArcMap for further analysis

After doing the above process click add, then: Apply, OK, OK, OK, and then close ArcCatalog. The new geodatabase is now stored with geodatabase that enables ArcMap to do the analysis and statistics for the type of theme exported either: point; line; or polygon. In terms of polygon themes which are digitized for land use, urban land has been calculated by deducting areas of mountains and farms. Moreover, areas of informal and planned areas are calculated.
Figure 4.16: Change setting of existing theme and choose a name for geodatabase to be stored with.

Figure 4.17: Change spatial references if unknown coordinate system to one to be used for all other analysis.
Such statistics are very important in terms of quantitative matters of implementation on the proposed model of neotraditional neighbourhoods within each pattern of subdivision, and estimates population capacity for the future and the cut in cost regarding infrastructure networks. This analysis is shown in chapter nine which defragments wasted spaces in dwellings by using satisfactory measures of spaces of rooms, set back spaces from front and both sides, vacant rough lands which are in the holy zone, and undeveloped vacant plots within planned areas.

4.9 Data Entry, Recoding, Calculation, and Analysis in SPSS

Data from questionnaires, interviews, reports, and other data sources such as electronic sources and Municipal Archives were extracted and clarified, and then entered using the most common tools of Urban Information Systems (UIS). Basic tools such as Excel's and Word's drawing tools are used. SPSS and Arc/GIS were the main professional ones. All data was revised, coded with all types of measures, and entered, then revised again. Calculation was essential to create some new variables for more analysis. Cross tabulation was undertaken for most neighbourhood variables and factors. Relationships or associations between variables and factors are checked using Chi-Square tests. Only very important factors and their associations with variables are presented in Chapter Six to avoid repetition and analysis in macro scale. But the factors are detailed in Chapter Seven because they are associated in terms of dwelling units in micro scale. Hierarchies
are considered in details of analysis regarding the urban scale. Simple bar charts are used and complicated line or dotty graphs are avoided except in a few cases. The first example below shows how a chart is very complicated and difficult to read and understand but in contrast, the second one is easier to read after summarizing data of satisfaction from five categories to only two.

![Figure 4.19: Complicated bar chart with multi categories in both rows and columns](image)

![Figure 4.20: Simple bar chart with only two categories of satisfaction with four types of neighbouring.](image)

Results are supported with translated direct interviews and public views and comments. Thus, qualitative data supports quantitative information. The main findings are summarized in each chapter’s conclusion. Biased results are avoided, especially if the ratio is very small or limited even if it supports the researcher’s goals and arguments.
Therefore this category is omitted from the graph to make it simpler and more accurate to judge for generalization. An example is shown below:

Figure 4.21: Bar chart showing high satisfaction to availability of plays areas
It shows that those who live in attached dwellings, but they are very limited and show 100% for positive satisfaction. It supports the researcher's argument for traditional neighbourhoods but this category was omitted to make a new chart without bias.

Figure 4.22: Bar chart showing high dissatisfaction with availability of play areas
It shows that the majority who live in different types of neighbouring dwellings, yet this reflects accurate judgment for generalization
Chapter Four: Research Methodology

This is a very successful finding that supports the arguments and characteristics of traditional neighbourhoods in chapter five, but because of the very small ratio of attached dwellings (one in number and 0.4%) of the total, its satisfaction levels are omitted and the bar chart now looks as above in Figure 4.22. Moreover, line graphs are also avoided in cases of multi-hierarchies for both factor and variables. The researcher has the choice to either reduce the categories of income or satisfaction levels but because the topic was about the income, he decided to generalize satisfaction to two categories from five and present data in a bar chart. The result was a more complicated graph. The researcher then used the option of the cut point or points.

![Satisfaction of Distance to schools](image)

Figure 4.23: Example for complicated line graph regarding satisfaction levels of distance to Schools defined by total monthly income. Reading and analysis are very difficult for basic reader.

![Distance to mail points](image)

Figure 4.24: Example in bar chart graph regarding satisfaction levels of distance to mail points (reduced to two from five) and defined by total monthly income groups. The chart is still very complicated to read and analyse yet the researcher has the choice of cut point for income groups.
Cut points are used to allocate the groups most related to the research goals. In the case of income groups the majority of Al-Madinah’s residents earn less than SR 8,000 and these people are unable to own their homes, and lived either in apartments in which they are unsatisfied or in informal areas for lower rental payments. A cut point is used to simplify the chart to the following:

![Bar Chart](image)

Figure 4.25: Example in bar chart graph regarding satisfaction levels of distance to mail points using cut points by recoding the variable to groups included in research and excluded one

### 4.10 Space Syntax and gamma diagrams for plans of dwellings

Space syntax is the organisation of construction of spaces within a dwelling, neighbourhood, or city. Its techniques and analysis were initially conceived by Professor Bill Hillier and his colleagues at The Bartlett, UCL in the 1980s (Laboratory, 1995). Space syntax Gamma analysis is a diversion of the design map into a special logic structure by abstracting rooms from their shapes and sizes (Tipple 2000), and starting at a point of entrance from an outer space. *Line* or *string* means door or arch with a barrier that leads from one space to another. Each space is shown as a segment or circle. The linear structure of both is known in architecture as an ‘enfilade’ when there is no choice to pass from one space to another (Bellal 2004). The opposite, when strings connect each segment with others in a network, is called a loop or ring shape. The degree of ring or loop is against control of space. A loop or ring always disperses control over space through social interaction. ‘Well controlled’ means that there is only a pathway through one space to another or to other spaces such as a hallway. A gamma
diagram also shows depth from the starting point (Tipple 2000). Mathematical interpretation of gamma analysis is not used here, where only diagrams are used to represent quality of integration of spaces within dwellings, and depth of dwellings as a whole. Single space depth is also shown in the diagrams for some illustrations and analysis of the dwelling’s components in both chapters seven and eight. In chapter seven, space syntax analysis of gamma diagrams are used to show integration or segregation between rooms and spaces within dwellings of all types: traditional houses; apartments and villas. This type of analysis is used to show how different or similar contemporary dwellings are from traditional ones.

4.11 Conclusion

The process of research methodology might be considered as the way that planners, architects, geographers, developers and politicians who deal with urban policy in reading the city. The flow of process starts top-down in reading from general view about the city, deeper to neighbourhoods, and last to go the way of deep investigation of actual measures of space that singles or households need to dwelling units. In contrast, while setting a policy, the flow should be bottom-up direction to form the policy or urban regulations that regulate space consumption without wasteful attitudes, and with satisfied measures. This is not only from the quantitative approach but also the qualitative approach in terms of forms of space and relation to resident’s cultural, social-economic characteristics and their satisfaction levels as an evaluation for quality. Empirical field work was conducted by the researcher to examine contemporary dwellings and neighbourhoods, and whether they fit with residents characteristics or not, and if they do not, what are the causes of that? Empirical personal interviews with most of those who deal with urban planning in Al-Madinah consumed 5 months of the researcher’s time and it was completed in two months of his holiday. Empirical data was sourced, and similar efforts made to update data to allow this research to be completed. Scientific methods were used in selecting the size of samples and their locations to represent residents from both patterns of urban land, informal and planned areas. Moreover, urban information systems were used as tools for the planner to read the city, to analyse urban form, to evaluate neighbourhoods before approval and to de-fragment the wasted spaces in urban lands.
The research took up a great deal of time but represented as it is shown now, it provides a guide for future planners, developers and dwellers in how neotraditional planning can be gained in a city by using urban information systems as tools for reading, analysing, evaluating and adjusting measures of de-fragmentation to avoid wasteful consumption of urban space.
Chapter Five: Traditional and Contemporary Neighbourhoods in Al-Madinah after Globalization and Transformation
Chapter Five: Traditional Hoash and open space

5.1 Introduction

In the global era, most cities around the world have been affected by modern architecture. In Saudi Arabia, cities became similar to each other and local identity has been largely lost. Building regulations were standardised by central government for all cities without consideration for local identity. In the previous chapter, neighbourhood standards are listed as proposed by the Dept. Ministry of Municipal Affairs for Cities Planning (DMMACP) and two local consultants as mentioned by Eben Saleh (1998). However, those remain proposals and may only be applied in a few new districts in Riyadh. On the other hand, neighbourhood planning remained under the control of two major decision makers in other cities within Saudi Arabia. They are Municipalities / departments of Urban Planning and landlords. The role of the latter means they benefit from maximum profits from saleable plots, and even other plots for public use remain under their ownership to be sold for education, religious, health or social services organisations. However, the landlord’s views, needs, thoughts, imagination and ideas are very limited regarding those who will buy, build, and then live in the resultant plots. Regulations of residential use are flexible in terms of size and the minimum is 400m². Inter-relationships between plots, open spaces, gardens, and safe walkways are usually ignored. The wasteful measures of such policies and regulations occur in plot areas, and verge areas from sides, front and back, which cause needless consumption of non-renewable resources (land and its ecosystems). For this reason, it is very important to carefully analyse the existing new neighbourhood plans and informal areas regarding these land use regulations and measures in re-planned informal areas. These could be compared with local traditional neighbourhoods, called ‘Ahwash’ and have been almost forgotten in Al-Madinah’s urban culture. As mentioned in chapter three, Al-Madinah is the first Islamic capital; it is also the city that should be taken as an urban model for Islamic cities to be built on, because it was the first city that was built upon the Islamic urban legislative system ‘Fiqh Al-E’imran’. Moreover, it is the city where the first neighbourhood model has been set for gathering dwelling units around an open space, rather than the fragmented ones as shown in chapter three. The Islamic law for urban legislative system was rooted from the Qur’an and Sunna to integrate urban neighbourhoods with the social system of neighbouring. All this is to reach the same aim of Dantzig and Saaty (1973), which is to gain

'The city so that it works better, so that neighbourhoods became more lively, safe, and relevant for children; and so that the city itself

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becomes a more exiting centre for personal interactions in today's fast-moving world'. (Dantzig and Saaty 1973), (Compact City: 1)

5.2 Al-Madinah's Traditional Neighbourhoods: 'Ahwash Al-Madinah'

With regard to the conservation of the specific local urban form of Islamic identity of Al-Madinah, we have to go back to its historical environmental roots, and the principals of urban planning started there by Prophet Mohammed (PBH) when he emigrated from Makkah, established the first capital, allocated the locations of new developments and began the ethical process of development. Mohammed (PBH) built the mosque of Quba’a as soon as he arrived in Al-Madinah, even before deciding where to stay. This led to the important and main role of the mosque in Muslim life and cities. Then, he (PBH) moved to determine the locations of new developments, maintaining that he could not accept any invitations from supporters ‘Al-Ansaar’ who were living in Al-Madinah. He (PBH) left his camel to move in a northerly direction and apologised to all who invited him to stay at their areas by saying the camel goes where it has been ordered. Then, when the camel stopped at a specific location, He (PBH) got off and let one of his companions throw a row between north and south and east and west and allocated the courtyard or open space to be used again as a major mosque, and a centre of the First Islamic Government. This government has formed the neighbourhood model since the first days in Al-Madinah. Moreover, he (PBH) decided which dwelling Muslims should use and that all these family units will form the city as it fulfilled the meaning of ‘Al-Madinah’ instead of the old Yathrib. He (PBH) determined the shape of these neighbourhood units and transformed a community in conflict to a harmonious one as stated by King (1998). Relationships between members of each unit were ruled by the rights of neighbours.

5.2.1 Neighbourhood

A neighbourhood is defined as a state of dwellings which are near, in the vicinity, adjoining, or attached (Brainy Media 2001). Neighbours are those who live in such dwellings. The neighbourhood is a holy matter in Islam, laws and neighbourhood rights are compulsory was and based on what was stated by Shamsuddin (2004) and in quotations from the Qur’an and Sunna. These laws preserve neighbour’s rights in terms of social, human, economic, political, and even psychological manners. Neighbour’s rights are a very general policy in Islam. Muslims were ordered by God to be kind and
do good deeds for neighbours whoever they are or whatever their beliefs. Such laws also preserve citizen’s rights. God said, as translated by King Fahad Quran complex (2004):

’Worship Allah and join none with Him (in worship); and do good to parents, kinsfolk, orphans, Al-Masākin (the poor), the neighbour who is near of kin, the neighbour who is a stranger, the companion by your side, the wayfarer (you meet), and those (slaves) whom your right hands possess. Verily, Allah does not like such as are proud and boastful’

(Complex 2004)

Many Hadith were said by the Prophet (PBUH) commanding Muslims to be kind to their neighbours. Most of these commands concerned with resident’s rights and responsibilities to their neighbours. In general and in the recent British view, neighbouring is seen by Bridge and Forrest (2004) as a balance between interaction and distance with emotional and practical relations between neighbours. They state that relationships are in decline but have become more mixed in a wider net due to increased mobility and ICT. They mention that children and older residents are more dependent on a neighbourhood. Such children and elderly people interact with the urban space of the neighbourhood more than other age groups. Henderson and Thomas (1980) state the importance of the neighbourhood for people who live in it but do not belong to it. A higher unemployment rate; more retired people; a changing demographic rate and technological innovations all create more time for residents to spend in neighbourhoods. A private, home centred life is also a major reason why people spend more time in a neighbourhood (Henderson and Thomas 1980). Moreover, in Bridge and Forrest (2004), Berry defines neighbouring as the interaction of local characteristics of residents within a place, so they conclude:

‘Much that is important about neighbouring seems to lie in the potential or latent qualities that may be activated should the need arise.’ (Bridge, Forrest et al. 2004)

Maliki’s school, which is located in Al-Madinah, interprets neighbouring of houses as those attached from one side or in front and separated by a narrow pathway, but not by a shopping cluster ‘Souq’, or by a wide river. Neighbours are those who share a mosque.

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1 (Ministry of Islamic Affaires, 2004), Quran, Chapter 4, Surat An-Nesa’a, Verse 36
However, the Hanify School interprets it as attached houses only (Shamsuddin 2004), which does not fit as described in the Prophet’s (PBH) neighbourhood below. These interpretations do not relate social interactions and relations with the urban space. However, Akbar states in his book ‘A’marat Al-Ardh’ the differences between Islamic legislative system and urban modern ones. He firstly defines the Islamic traditional environment as the group of buildings and spaces in between, which were built by Muslims with reference to Islamic principals, local norms, conventions, and affordable building materials without interference from the government unless there was a conflict between neighbours (Akbar 1998). He gives an example of ‘no harm or harness’ as an Islamic principle, which affected most traditional environments. He then states that conventions in each geographic region are the factors that most affect the built environment, more so than building materials. For example, wooden windows - ‘Mashrabiyyat’ - are common in Makkah traditional buildings where the affordability of wood is not the same as in Al-Ahassa’a. He states that the Islamic legislative system left estates to be managed by the united model of use, tenure, and control, thus public rights and responsibilities became important for all regarding their environment. Moreover, Islamic principals led to an increase in such models, especially private estates. Social conventions and norms are the common values between residents, either under semi-public tribal groups or general ones in Islam.

Moreover, he defines courtyards in Islamic traditional environments as an open space in front of an estate; either a house or a room, but is unlikely to restrict a courtyard only to the inside of a house. He adds that they are for the use of residents in attached estates. He declines to mention that Prophet Mohammed was the first who designed courtyards between houses in the Islamic nation in Al-Madinah.

The right of use ratio as Akbar (1995) states depends on the width of road, pathway or the open space. Rights of use for the residents were allowed for cosmetic uses such as; setting, having shade, for conducting trade, storage, tying his horse or camel within or any other uses that did not harm any neighbours or those who pass through. In general, it is not permitted to build in this area, especially if the building harms any neighbours or pedestrians. Such issues and rights of use are left to Islamic law courts (Qadha’a), and strongly related to the rule of “no harm or harness”. Thus, such areas seem to belong to residents and all share in tenure of such roads, or open spaces. This open space, which is an urban feature of neighbourhoods, formed social relationships between neighbours, and is lacking in our built environment today. Islam affects
neighbour’s relationships and their attitudes to each other even if they are not Muslims. Jewish people who live in Islamic countries were located more in neighbourhoods than those who lived in European countries, as shown in the findings of Shuval (1956). It seems that Islamic urban law plays as important a part as the weather conditions in affecting life, and consequently affects activities and the neighbourhood. Thus, Bridge and Forrest (2004) conclude that neighbouring at present is less common than it was in the past; it is very limited to immediate residents, occurs more in the summer and is a personal not a household’s choice.

5.2.2 Definition of ‘Hoash’

Old neighbourhoods in the Al-Madinah case study were unique. They always included an open space as an activities area (play, parties, gathering of elderly people). Each open space with surrounding houses was called a ‘Hoash’ in single and ‘Ahwash’ in plural. Hoash means exactly the word ‘court’, which is:

’an uncovered area shut in by the walls of a building, or by different building; also, a space opening from a street and nearly surrounded by houses’ (brainydictionary 2001).

It may also originally come from the word ‘Hush’, which means a small area with palms that do not need to be irrigated. Kaki (1998) states that the Prophet (PBH) granted Abdul Rahman a ‘Hush’ to the north of the Mosque, and Abi-Talhah also had a Hush there. A Hoash is not only a physical built environment, but it is a part of a triangle that cannot be understood without the other two parts, the people and their culture (Kaki 2000). Islam was the main part of the culture, and the people were the Prophet (PBH) and his companions, who, for 14 centuries, have made decisions of policies, regulations, and law to manage neighbour’s rights. A Hoash is a piece of heritage that has lasted until 15 years ago when they all were demolished for the extension of the Prophet’s (PBH) Mosque, which is a compulsory priority to occupy the huge crowds of pilgrims and visitors to Al-Madinah.

Neighbourhood means in Arabic ‘Mojawarah’, which is a noun of Neighbour or ‘Jaar’. In terms of Islamic law, a neighbour has a very high status. In Qur’an in Surat An-Nesa’a, which means ‘The-Women’, verse no.36, he is one of those recommended to be kind to in the third command. Kindness is to be given to single neighbours or to the whole community as Shamsuddin states (Shamsuddin 2004). Moreover, there is a
detailed hierarchy of neighbors who should be the priority for good deeds in the sight of God. The relative neighbour is the one who has first priority to be kind to, then the next nearest one and so on. So, the neighbourhood is called this because of the neighbourly attitude of people or places. In its geographical meaning, it is for neighbouring inhabitants. For people the meaning is social one. It has been said that one of four ‘happinesses’ is a good neighbour (Hakim 1986).

Before Islam, Arabs were very generous to their neighbour’s guests. This was because of the status of the neighbour himself and of social customs and attitudes. Nevertheless, if a neighbour has debts, or has a disaster, all the neighbours cooperated to help. When Islam arrived it recommended to keep these positive social customs and reward them as they were good deeds for God. All such customs and attitudes were social practice, but not a social system as it became after Islam. Islam saw social neighbouring as a model of solidarity of socio-urban units to build up the capital of the newly developing nation. After Islam the neighborhoods became a united community forming Al-Madinah.

Hakim (1986) refers to some Hadith phrases related to the neighbour’s status in Islam. He states that Anas narrated that the Prophet (PBUH) said:

‘He whose neighbour is not safe from his harm and dishonesty, will not enter Paradise.’

(Hakim 1986)

It was narrated by Aisha in Al-Bokhari that the Prophet (PBUH) said:

‘The angel Gebriel² kept exhorting me about neighbour to point that I thought he would grant him the right of inheritance.’

She also narrated that when she asked the Prophet (PBUH): ‘O Messenger of God, I have two neighbours, to which one should I give this present? The Prophet (PBUH) said:

‘To the one whose door is nearest to yours’

Narrated by Abu Horairah the Prophet (PBUH) said

‘He who believe in God and the Day of Judgment should not hurt his neighbour’,

Narrated by Abu Horairah that the Prophet (PBUH) said

‘No one will be a believer who sleeps with full stomach, while his neighbour is hungry’.

And narrated by Abu Horairah that the Prophet (PBUH) said

² In Islamic believe: Gebriel is an angel and messenger between God “Allah”, and Prophet Mohammed
~A neighbour should not forbid his neighbour to insert wooden beams in his wall.~

Narrated by Ahmed via O’qbah Eben Amir that the Prophet (PBUH) said:

~In the Day of Judgment, first adversaries are two neighbours.~

Narrated by Eben Mas’ud that a man asked the Prophet (PBUH) ‘how do I know that I have done good or bad?’, then the Prophet (PBUH) said:

~If you hear your neighbours saying that you have done good, then you have done good, and if you hear them saying that you have done bad then you have done bad.~

Ebn O’dai via Amro Eben Sho’aib via Father via Grand Father that the Prophet (PBUH) said:

~Do you know the right of the neighbour...you must not build to exclude the breeze from him, unless, you have his permission.~

Narrated by many resources via Jabir that the Prophet (PBUH) said:

~A neighbour has pre-emption rights over his neighbour’s property. If they share common access, even if the neighbour is unsent then he should wait for his return.~

And last narrated by Bokhari via Abu Rafi’ that the Prophet (PBUH) said ~The neighbour has the right of priority.~ (Hakim 1986)

It is reported on the authority of Abu Horairah that the Messenger of Allah (PBUH) observed:

~He who believes in Allah and the Last Day should either utter good words or better keep silence; and he who believes in Allah and the Last Day should treat his neighbour with kindness and he who believes in Allah and the Last Day should show hospitality to his guest~ No:75, book of faith, (SahihMuslim.com 1995-2005)

It is reported on the authority of Abu Horairah that the Messenger of Allah (PBUH) observed:

He who believes in Allah and the Last Day does not harm his neighbour, and he who believes in Allah and the Last Day shows hospitality to his guest and he who believes in Allah and the Last Day speaks good or remains silent. No 76 book of faith/ (SahihMuslim.com 1995-2005)
5.2.3 First Hoash in Islam as a Neighbourhood Model

'Arabs built of tribes a strong social collaborated unit. But it was lacking only leadership, and law. Islam then came with these two means, built on the leadership of the Prophet's personality, and the law that came from God. Though, they reached with them to the top of integrated urbanism and unity.'

(Ash-Sherazi 1998)

It has been claimed by Watt (1964) that the document of Prophet Mohammad's (PBH) first residence in Al-Madinah was accepted as evidence for his political situation and constitution of a new political unit such as 'community'. It has been described as a federation of nomadic clans or tribes. He also stated that the community acted as a tribe and 'it is not unfitting to describe the community as a super tribe as he 'Prophet (PBH)' did. The emigrants with him were as one unit of community or clan and he (PBH) was the chief, and other clans were three from the Aws and five of the Khazraj (Watt 1964). The Prophet's clan was the centre and the others surrounded it. Such a clan unit or community had its unique model of neighbouring in the physical built environment. Watt also mentioned the verse says that 'wherever there is any thing about which you differ, it is to be referred to God and Mohammed' as agreement and direction for Al Madinah residents at that time. With their Islamic background, Al-Madinah residents believe that present and future generations should refer in their daily life to God and Mohammed (PBH), including in planning issues and especially those dealing with Al-Madinah neighbourhoods. The Prophet (PBH) showed his companions how the development of an Islamic community should occur. Yet, planners of Al-Madinah should then follow on from this. The Prophet (PBH) was a politician, social advisor, and urban planner. He (PBH) made decisions on the development of the location which were ordered by God. He (PBH) commanded his friends to surround his mosque to form a society unit of neighbouring and its hierarchy, and he sub-divided plots for other tribes to build the same units incrementally.

He (PBH) set the earliest proposal of Islamic neighbourhood planning (Kaki 1998) and was ordered by God to go Al-Madinah, and establish the Islamic Nation there. When he built his mosque and houses, he left his companions to build their houses around the mosque courtyard. It was an organization of his relatives (wives), and friendly
companions who migrated from Makkah around the mosque as his closest neighbours. Then he (PBH) ordered the rest of the companions to build their houses in the rectangular lots he granted for each tribe. This was a model for Muslim community formation for a number of reasons, firstly as a spiritual meeting with God\(^3\) when they prayed in one mosque for one God. Secondly is the social duty to do good deeds for parents. The third reason is related to social relationships of wives, and relatives. Yet, Muslims houses are still large to occupy relatives and especially parents if they do not have their own houses or they net special care. The last is as urban gathering of neighbouring. Then, human duty is to donate for the poor. This is as a continuous charity that helps poor to dwell and live. Neighbours are classified to three categories. They are relative ones; attached ones, and attached friends. This can be abstracted as shown in the figure below:

![Model of Hierarchy in the Islamic Neighbourhood](image)

Figure 5.1: Model of Hierarchy in the Islamic Neighbourhood: Social relationships form urban harmony and integration in built environment and raise the status of neighbours.

The gathering of houses in regard to social relationship such as tribe or friends was followed also in Baghdad (The Circle City) when it was first planned. It was apart of Arab custom and social life. Akbar quotes that homogenous residences referred to the same origin, tribe, profession, or Math‘hab ‘School of Islamic law’ (Akbar 1998).

\(^3\) In Muslim believe, prayer is the meeting or contacting with God “Allah”. Muslims share one God.
Kaki (2000) states that the Prophet (PBH) and his companions were the right people with the Qur'an and Sunna as right information, who form this neighbourhood as the right decision at the right time (Kaki 2000). The mosque area was incrementally expanded many times in his life until it reached the final shape with the dimensions shown in the diagram. Few houses of companions were inside the final extension, but they were replaced outside, such as Dar Abo Bakr As-Sideeq (No: 18) which was originally between his house and the As-Salam gates in the western side. As can be seen below, the Prophet’s neighbourhood (PBH) was a large Hoash. It was about 2500 m² (Kaki, 1998, p: 72; (Al-Harbi, 1998, p: 23; and (http: //www. al-madinah.org/engl/2004).

Figure 5.2: Layout of Prophet (PBH)’s Neighbourhood
Prophet (PBH)’s Mosque Location in the middle as courtyard and between houses of wives and companions, main corridors, and entrances (areas are not accurate)
Source: locations and names sourced from both Kaki (1998) and Al-Harrbi (1998) keys plate in appendix

Approximately fifty houses surrounded the Prophet’s house. Nevertheless, he set laws (Fiqh or Shari‘ah) to rule and control neighbour’s rights and responsibilities. Bokhari
(1978), Hakim 1986, Al-Harrbi 1998, Kaki 2002, Akbar 1995, and Shamsuddin (2004) address those Qur'anic Verses and Sunna Hadith and other Islamic law sources which form the basic principals of a city shaping system or what we can call an Islamic urban policy for city planning. At that stage, the Prophet (PBUH) firstly set up the Mosque and its environs as the main urban space to gather around and set the size of this space at 50 m X 50 m. Mustafa states that area was about 2480 m². He also claims that Hoash was formed by supporters' houses surrounding Prophet's Hoash (Mustafa 1981).

Secondly, he (PBUH) was granted lands from rich landlords in Al-Madinah, and he then subdivided those lands into lots and granted them to migrants in need of land to build their own houses. Thirdly, he (PBUH) granted beyond these rectangular planned urban units to be subdivided by each tribe to its members, and to be built incrementally whenever they needed to build. Whoever could not build or farm the land gave it to another person who could develop it and had the right to own it.

5.3 Hoash as a Sustainable form of Neighbourhood Concept

Ten centuries later, the Hoash was still used as the urban system of gathering a group of buildings for security reasons after urban extension extended beyond the city walls. Nevertheless, it has been stated by Hussayin, 1992, that one gate of the Prophet's (PBH) mosque was leading to Zogag that leading to Hasan's Hoash or 'Hasan Hush', which was in the north west of the Prophet's (PBH) mosque (No:24 in diagram above). However, as shown in the diagram and map No: 5.2, this urban system became a neighbourhood model for forming a group of houses. Most were recorded in the sixteenth century and many remained four centuries later. Most of them were demolished in 1991 as a process of King Fahad Extension Project for Prophet (PBH) Mosque and Central Area. As in other Islamic cities, Al-Madinah is characterized by narrow routes and rows of houses in the central area, the 'old city', with an open urban space in between in some cases. Twenty five Hoash were reported by Ali Bin Mosa (1885 A.D.). Old records of Al-Madinah Court showed that first documentation of Hoash was in 963 H (1355 A.D.). Al-Hussayin (1992) shows two such records as evidence for the existence of Hoash at in the time 1340 A.D. This means that they were probably there even before that time. Therefore, it was a unique form of urban neighbourhood in Islamic Cities. It could be called 'the Courtyard Neighbourhood'.

Neither holy Makkah nor Baghdad had a similar form, although Fez did. Figures below show the urban fabric in such cities. In most Islamic cities courtyards lie within the
houses, but in the case of Al-Madinah they are mostly in the neighbourhood and between dwellings. Hoash have been discovered by researchers in Old Cairo/ Egypt in both references Hanna (1978) and Burton (1893). But in general most Arab old residential (50%) quarters were seen as deadends as stated by (Raymond 1984). He states that ‘such quarters were called ‘Hara’ in Cairo and Damascus, ‘Mahalla’ in Aleppo, Al-Mawsil, and Baghdad’. He argues that such characteristic features of those Arab Islamic cities originally came from Greco-Roman and Occidental medieval cities. On the other hand he does not mention that part of Cairo has courtyards in between groups of buildings. In some old maps, the researcher noticed that old parts of cities have the same form of neighbourhood ‘Ahwash’ in old Cairo. The researcher refers to this because of Maliki Madhab which spread from Madinah to part of Egypt as shown below (Figure 5.6).

Figure 5.3: Sale urban fabrics
Moreover, built neighbourhoods adhered to Islamic law and were built in reference to their schools of law ‘Madhab’ (Hakim 1986). Nevertheless, Arab traditional society is comparatively egalitarian, rich and poor districts are quite similar and consequently poor and rich families are neighbours. On the other hand, Raymond rejects the single stereotype of modelling all Arab neighbourhoods in one form where each one has its own principal of locality either by geography, religion, or ethnicity to fulfil their

Figure 5.4: Makkah urban fabrics shows few courts but they are not as much as in Al-Madinah
Source: Bianca, 2000, ‘Urban Form in Arab World’
Chapter Five: Traditional Hoash and open space

cultural aspirations (Raymond 1984). Aal-Haram (2004) states Arabs localities are missing in the contemporary built environment, and that this situation exists in various cities. He states that it is not only the built environment that affects mankind’s behaviour but also the culture he/she has and lives within. Yet, Malikies School suggests that urban law was a part of the culture for those who lived in Al-Madinah.

It was well known between Muslims that Al-Madinah residents were very kind and different from those in other cities. In the researcher’s childhood this type of statement was commonly heard, until those neighbourhoods were demolished. Al-Madinah’s form of neighbourhood ‘Hoash’ was as a local cultural fulfilling of its own traditional identity formed by its Maliki (Madhab) which is regarded as the work of Malik bin Anas, ‘the work of Medina; (A’amal Al-Madinah). This text book was the earliest surviving one of Law ‘Fiqh’ which was categorized into two parts; ritual obligations (‘Ibadat) to God, and normative behaviour between people of the community (Mu’amalat) which was regarded in the public interest and extended later to other localities (Waines 2003).

![Image: Al-Madinah Urban Fabric and Ahwash](image_url)

Figure 5.5: Al-Madinah Urban Fabric and Ahwash, (Bianca 2000), edited by the author

By looking at digital maps of fragments of Old Madinah, the only remaining Hoash that can be seen is located to the west of the Prophet’s Mosque, and part of Hoash Ar-Raa’e. The figure 5.6 shows both the remained old Ahwash, and their location. Those legal laws of normative behaviours, including those between neighbours were the cultural fulfilment of the neighbourhood ‘Hoash’. Geographically it has not spread because of
the Islamic school of law *Malikies Madhab* in Al-Madinah, which has spread partially to Egypt and West Africa, but later where *Shafies* law spread to the north and east of Africa including Egypt and this why it is shown as limited in Figure (No 5.7). Most of Old Madinah's sections were in the form of *Hoash* as stated by King (1998). He states that the major street 'A'nbariah', which runs from the west to the Prophet's Mosque, is characterised by fine houses, which were similar to those within the walled city.

![Figure 5.6: Remaining hoash sourced from digital maps and manipulated by author](image1)

![Figure 5.7: Ahwash form in Bulaq in Egypt, Source: (Hanna 1978), edited by the author](image2)
5.4 Hoash features and measurements

About 78 Hoash were identified from a map of 1953 AD⁴. It was designed for with regard to human scale of width not for vehicles. Ahwash, which usually do not have space for car parking in most modern neighbourhood plans, are largely ignored. Variation in such urban areas was very clear between each Hoash in terms of the area of courtyard between buildings, and the number of surrounding buildings. Most are named with regard to famous family names, landlords, various activities or professions, or for the Hoash form. Names are often single words, making them easy to use and widely known. Some names have been changed in some cases, and others may have been slightly altered. As said before, the recorded number is 78 Hoash including one with an unknown name. Twelve of them were inside the internal walls, and the rest were outside the internal walls of Al-Madinah and sometimes the outer walls.

5.4.1 Hoash area

The area of a Hoash includes the total area for houses, roads, and the courtyard between them. In all, the Hoash area varies between 110 m², and 4730 m² (four cases are ignored because of illogical values regarding the maps in terms of Ar-Raa’e case, and with regard to more than 5 houses within). About 47% of the Hoash are less than 607 m² which is the median, and about 68% are less than 1150 m² (mean value). Regarding the Prophet’s (PBH) Hoash area, about 83% of all are equal size or less. But those which are exceeded more than area of 2,500 m² were historically the last and geographically the outer ones. They may have been built ten centuries later and have not been furnished with extra buildings because of the demolition of the walls. Thus, we can say that most traditional ‘Ahwash’ courts were guided by the Prophet (PBH) to his followers in terms of area. The table below shows the statistics resulting from the analysis in SPPS. However, in our contemporary building regulation, is it regarded as the minimum area for a single plot; these building regulations are very wasteful.

<table>
<thead>
<tr>
<th>N</th>
<th>74</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>1150</td>
</tr>
<tr>
<td>Minimum</td>
<td>110</td>
</tr>
<tr>
<td>Maximum</td>
<td>4738</td>
</tr>
</tbody>
</table>

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Area of Hoash

Figure 5.8: Percentiles of Hoash’s Area, in case of 2500 m², percentile is over 80%

5.4.2 Number of Houses in Hoash

Number of Hoash varies with regard to size of courtyard and the number of houses within. As shown in the table of statistics below, the number of houses in a Hoash varies between 8 and 74. Those courts with less than 14 houses are about 28% of the total. If those that have less than 24 are considered, which is the mean size of houses per Hoash, they will be about 68%. Those courts which did not exceed the number 50 as the Prophet’s (PBH) Hoash had are about 94%. Greater number of neighbourhoods is less than forty houses, yet ‘40’ houses can be considered as number of neighbours for each house as stated by Shamsuddin (2004). The researcher contacted the Shamsuddin and asked why he sometimes mentioned that the size should include 240 of his neighbours and Shamsuddin’s son replied that neighbours are considered by his father ‘Shamsuddin’ from six direction: front, behind, right side, left side, below floors, and above floors. However, as shown in the figure of the Prophet’s (PBH) neighbourhood, about forty of his companions and ten of his wives were neighbours. It was narrated by Abdullah As-Sadiq that the Prophet (PBH) said:

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'Every forty dwellings are neighbours, in between hands (front side), from back side, on right hand side, and on left side' (Shamsuddin 2004)

Nonetheless, it is narrated via Abo Horairah that the Prophet (PBH) said:

'Jibreel recommended me on neighbour up to forty houses, ten from here'.

Then, he (PBH) repeated 'ten from here' three times more to show that ten from each side of front, rear, right, and left side (Shamsuddin 2004). It is also narrated by Abo Dawood that the Prophet said:

'Whom who reside in forty houses is a neighbour' (Shamsuddin 2004)

Shamsuddin assumes directions to all narrated hadith are to a single dwelling and other neighbours surrounding it. In the case of Al-Madinah, where the courtyard of a ‘Hoash’ is in the middle it is clear that forty houses surround the courtyard, as in the courtyard of the Prophet’s (PBH) Mosque, which was between the houses of forty companions plus the houses of his wives. Moreover, King quotes that each Hoash had between 30 and forty houses (King 1998). Thus if we consider the number of houses in the Neighbourhood Model 40 will be that size of neighbours as the smallest community unit.
Chapter Five: Traditional Hoash and open space

for neighbouring. Extra dwellings may be added to the same plot of the house for extended families also.

Table 5.2: Statistics for number of houses in hoash

<table>
<thead>
<tr>
<th>N</th>
<th>78</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>23.60</td>
</tr>
<tr>
<td>Minimum</td>
<td>8</td>
</tr>
<tr>
<td>Maximum</td>
<td>74</td>
</tr>
</tbody>
</table>

5.4.3 Relationship between Number of houses in a Hoash and its Area

The continuity with such guidance in both size and number of neighbourhoods is very high and even after twelve centuries it is still around 85%. Despite how much those areas and numbers met the needs of those societies at that time, and how sensitive they were, we left the guidance and adopted alien methods to plan our built environment. In short, local neighbourhoods that gathered around the local mosque, which we should regard as a base for urban planning in our Islamic cities, should not exceed 50 houses in the neighbourhood, and courts between should not be more than 2500m². The area and number of houses that are less than the area and number of the Prophet’s (PBH) neighbourhood shows a relationship between the area and number of houses which is nearly linear. Figure 5.10 shows this relation.

![Figure 5.10: Linear relationship between area of Hoash and its number of houses](image)

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Linear Method MODEL of Relation between Number of houses in Hoash and its area:
The Equation will be as follows:

\[ Y = a \times X + b \]

Y is Number of Houses in Hoash
X is Area of Hoash (court or open space)

\[ a = 0.01 \quad b = 14 \]

Consequently, the equation will be, \( y = 0.01 \times x + 14 \)

(14 here is the intersection value between a linear graph with the Y axis)

(14 is the mode value of Number of houses in Hoash)

(14 is also percentage of Ahwash that have a Trapezoid shape the same as the Prophet's), thus 14 might be used as the maximum number of attached units of a block in a subdivision of neighbourhood planning regulations.

5.4.4 Shape of Courtyard within Hoash

The shape of courtyards varies from one to another and no one favourite emerged. The shape is regarded here as the original shape of the courtyard within a Hoash before any extra buildings were constructed in the middle. The result is as shown in the diagram below.

According to the Prophet's (PBH) design of the shapes he used in the court of his mosque, the rectangle was the most common. A square courtyard is second, when he (PBH) used the dimension of 50 m² is the size of each side. The trapezoid was the last shape for the Prophet neighbourhood, after building his wives houses inside the walls, as shown in his neighbourhood diagram. Linear shapes are similar to Zogag's shape, which is a long narrow walkway with dead end. In summing up all these shapes which are considered as continuous and sustainable constructions of the first neighbourhood unit, then the sum will be over 90% of total courts similar to those shown in figure 5.5. The rest developed with regard to the nature and topography of the land or farms, as those respected in Al-Madinah, and it is banded to take off plant, trees, or palms in the Holy Zone 'Haram Al-Madinah' as shown before in chapter two. Here it is very clear that residents of each Hoash should decide how their built environment should be built. This is in line with the Islamic principal of 'Shura', which advocates involving the public in decision making.
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5.4.5 Privacy

Privacy is an important issue for Muslims, as it concerns their indoor and outdoor built environment (Eben-Saleh 1997). Hoash in Al-Madinah were a semi-private space for all residents who were living there and was the responsibility of each member. Each Hoash was unique in its shape and character as shown above in various shapes and areas. Each one had its own gates as shown in Figure 5.12.

Entry to each Hoash was reserved only for residents, visitors, and service deliveries. Consequently, most had only one entrance, closed at night for security reasons (Zeedan 1988). If the Hoash is larger, it may have two or three entrances for easy access and for short cut exits for elderly people to go to the mosque and shopping. The Prophet’s (PBH) neighbourhood had three main gates, and most neighbourhoods do not exceed this number. The increased number of gates for the Prophet’s (PBH) Mosque extensions is required because it is a Central Mosque for the city and the Islamic Nation and as both of them increased in size, consequently the number of visitors increased.

The privacy of Hoash offered security from thieves or strangers and safety for the elderly and children from traffic outside. Elderly people acted as neighbourhood watchers during the day when most heads of families were at work. They took their responsibilities from Hadith of Prophet’s sayings:

![Figure 5.11: Chart of percentages of Ahwash shapes](image)
Chapter Five: Traditional Hoash and open space

It is narrated on the authority of Anas that the Prophet (May peace blessing be upon him) observed:

`By Him in whose Hand is my life, no, bondsman (truly) believes till he likes for his neighbour, or he (the Prophet) said: for his brother, whatever he likes for himself ’ No: 73, book of faith, (SahihMuslim.com 1995-2005)

It is narrated on the authority of Abu Horairah that the Messenger of Allah (May peace and blessing be upon him) observed:

`He will not enter Paradise whose neighbour is not secure from his wrongful conduct. ’ No: 74, book of faith, (SahihMuslim.com 1995-2005)

'Aisha reported Allah’s Messenger (May peace and blessing be upon him) as saying:

`Gabriel impressed upon me (kind treatment) towards the neighbour (so much) that I thought as if he would confer upon him the (right) of inheritance.’ (No: 6354, The Book of Righteousness, Manners and Joining the Ties of Kinship/(SahihMuslim.com 1995-2005))
Thus they tended to avoid any harm, and wrongful conduct, and liked their neighbours to be as secure and safe as they were. For that reason, such neighbourhood ‘Ahwash’ were models of virtuous community units as traditional neighbourhoods.

5.4.6 An Open Space for Multiple Activities

The Prophet’s (PBH) Mosque was a courtyard for most activities at that time. It was used as a rest station for travellers. They used to tie their camels on palm columns, which were holding up the roof of the guest place which was called ‘Assofah’ as shown above in the Prophet’s neighbourhood (PBH). An As-Soffah is a shaded area for the poor, elderly, and visitors where residents of Al-Madinah generously gave food and other supplies as required. Medication tents were built inside the courtyard for injuries received during war periods. The Hoash was an open space for resident’s activities. The local mosque was not included in the Hoash because Al-Madinah was a small city and all residents could pray in the Prophet’s (PBH) mosque. Maliki school limited neighbourhoods from gathering around one mosque or two small ones. This is in regard to religious and social activity but for pure social activity, children can play in hoash, elderly men can sit and talk and festivals and parties can be held there. The author remembers he played most of the traditional childhood games inside ‘Hoash Al-Johari’.

The Prophet prohibited people to stay on walkways with no reason unless fulfilling walkway’s rights (PBH). Abu Sa’id Khudri narrated that Allah’s Prophet (PBH) said:

‘Avoid sitting on the paths. They (his Companions) said: Allah’s Messenger. There is no other help to it (but to sit here as we) hold our meetings and discuss matters there. Thereupon Allah’s Messenger (PBH) said: If you have to sit at all, then fulfil the rights, of the path. They asked: What are their rights? Thereupon he said: Keeping the eye downward (so that you may not stare at the women), refraining from doing some harm to the other and exchanging mutual greetings (saying as-‘Salam ‘Alaikom’ to one another) and commanding the good and forbidding the evil.’ No: 5293, book of Pertaining to Clothes and Beautification/ (SahihMuslim.com 1995-2005)

Hoash was a space determinism that increased the social interaction of residents regarding their shared culture and space (Kaki 2000). Thus, people in Hoash were like members of one family even if they were from multi-ethnic origins. The block of buildings is a solid fabric of urban form and the ‘Hoash’ was the shared courtyard. They took care of each other, child, female, elderly, and their Hoash. This is because people
understood their built environment and its codes, which were not foreign ones. Nevertheless, a Hoash was a flexible environment with many choices. Relatives and guests who wished to form a family were allowed to build their own houses in the Hoash. Furthermore, people helped to furnish new houses for the new residents. Some windows and frontages were closed when new buildings were attached to an old one, but they were still satisfied. Thus, most linear courts ‘Ahwash’ started with a courtyard, but after adding new buildings they became linear ones. Shared social and economic concerns took precedence over private benefits. In general, a Hoash was a good quality built environment for the following reasons: people shared space and culture; they interacted in space and time and its design was flexible for many choices. Therefore, each part, shape, area, corner, and the people in the Hoash had specific meanings for other residents (Kaki 2000).

As mentioned above by Bridge and Forrest (2004), neighbouring occurs more during the summer in Europe because of cold weather conditions in European countries which make outdoor activities more difficult, and consequently hamper neighbourly relationships. Of course, most outdoor activities in cold countries such as Europe increase in summer and so relations grow or are created. However in Islamic countries, and Al-Madinah specifically, the weather is usually hot and activities are likely to occur throughout the year. Consequently, more activities and relations will occur between neighbours. Some may argue that a hot climate also reduces activities, but the way that the old Islamic environment was built, especially in Al-Madinah, means the hot weather does not influence activities, especially if there are narrow shaded roads and pathways. As shown below in Figure No. 5.1, hot wind movements between narrow shaded pathways are cooled and move down while the old cool ones which were in open spaces and became hot rise and are replaced by the new cool ones for most activities.

Good weather conditions allow for children’s activities, and often parents or brothers will watch. Seeing the next door neighbours will of course create a relationship initiated by a simple greeting or talking about the children. The urban spaces necessary for activities are lacking for the present residents in new districts, and consequently they do not have the same relationships with their neighbours, sometimes there is no relationship. It is the urban neighbourhoods and their culture that form relationships between people living there. They are described by Burchhardt as separate hamlets divided from the neighbouring one by gardens (King 1998).
The Hoash created a very strong relationship between the environment, climate, houses, spaces, people, and culture but these built environments and forms of Hoash was not reserved and sustained as part of the culture of a holy city and Islamic urban law to follow in term of neighbourhood planning. Transformation and urban change happened as it was in other cities in Saudi Arabia and other countries.

5.5 Globalization and Transformation of built environment

The global era has experienced vast change in the economic, social, and cultural systems used on an international scale or level as general shared systems or policies. Globalization is preferable in terms of democratic systems, technological tools and their application for new economic policies. Schaeffer states that any economy not supported by democracy will face collapse in the long term as democracy is a factor of production (Schaeffer 1997). Its concept is to compress locales in one international economic market, but it should be localized to fit each society and its culture, economic, and political system. International investors (large firms and companies) enter in other countries to compete within and regional investors look in other regions to do so. Robertson (1992) states that in the early nineties awareness of such movements and implication of their actions was realised, even if there has been recently quite a resistance to it. He then states that in the late nineties globalization became more complicated and harder as sociologists and theorists made it a core for their works such as Comte, Saint, Simon, and Marx. Though nationalism became stronger and so modern societies were delivered in this dilemma and became its victims (Robertson...
modem theories of architecture and planning have spread since the middle of the
nineteenth century. Urban forms have changed, as seen in the development process of
modernization. Globalization should be used in an economic manner to rescue urban
populations from poverty (Moulaert 2000). Its strategies should be reflected in urban
forms but not neglect a society’s locale and its traditions and heritage. However, sadly
strategies affect the entire world as Clark states:

‘The strategies implemented by the latter cause dreadful effects on Third
World countries, old industrial nations and regions, cities and urban
neighbourhoods.’ (Moulaert 2000: 3)

He argues that inner-city neighbourhoods in large cities follow cycles of economic
growth and decline. They either gain or lose their development and status and
consequently the residents become richer or poorer. While such districts or
neighbourhoods are considered to be deprived and problematic, a new development is
the only solution. Meanwhile, inner districts service not only the local, but
internationally all Muslim visitors to Al-Madinah, highlighting its importance as shown
in chapter two. Even so, Al-Madinah’s traditional neighbourhoods ‘Ahwash’ were seen
as problematic and deprived areas. International hotels such Hilton, Sheraton, and
Intercontinental, were allocated within central areas and established new branches of
their groups with huge high rise buildings. On the other hand, local contractors and
residents were pushed out one of the most profitable areas in the world. Those
traditional neighbourhoods and houses in Old Madinah were demolished completely (as
shown before in previous chapters) and were replaced by global Hotels in the same
locations, and by modernised residential districts outside King Faisal Road (First Ring
Road). Global hotels such as the Sheraton, Meridian, and Hilton, or regional wealthy
men and a very few local ones competed for plots in Al-Madinah’s central area after the
demolition and re-subdivision of land as shown in chapter two. Naerssen (Schuurman,
Albrow et al. 2000) states however that cities throughout the world accumulate and
concentrate national capitals and major financial markets. It may be true that the built
environment in Saudi Arabia has been affected by globalization; Al-Madinah has been
affected by globalization and nationalization in terms of neighbourhood planning. It
seems this transformation has occurred with no regard for status in terms of education
and in the process of development. Al-Madinah is at the core of continuous change in
the built environment, it has a powerful economy, and society. Thus, to fulfil the
requirements of large companies looking for the best location, in Al-Madinah the area
around the Prophet’s Mosque are the best location for investments. Consequently, it is proposed that the extension of the Prophet Mosque and the development of the surrounding areas will keep regard of the measures of the capital’s requirements and needs. Abdul-Fattah (Editing Manager of Al-Bina’a Magazine) states that because of the poor condition of the farming parts of Old Madinah, and the unsuitability of the new extension of the Mosque and expected occupancy for new visitors, it was essential to prepare a plan for the central area to occupy between 50,000-350,000 visitors annually (Abdul-Fattah 2004). He continued by saying that results of the plans are:

- Decline in number of properties in central area from 3262 to 570
- Increase in plots’ areas from 150 m² to 900 m²
- Increase in residential areas to five times the old one
- Increase in commercial area to four times of that before development
- Increase of governmental utilities by five times as much
- Increase ratio of roads areas from 42% to 55% (large ratio here because of rush season of Hajj and buses loading and pick up from high rise hotels).
- Increase concrete buildings from 56% to 100%
- Clearance of traditional buildings

This was done for the benefit of visitors but the needs of the original residents of those areas were neglected. The heritage of the old city was destroyed. The way of life of the next generation was changed. In the central areas it might be thought that the decision makers had a global view, as Muslim visitors from all over the globe wished to reside beside the Prophet’s Mosque (PBH), but that should not harm local residents and prevent them from neighbouring the Prophets Mosque. Why should local residents who were born and grew up there, have to live to far away from the holy area? They were obliged to leave this location and to accept what their properties were valued at. They have to live outside that zone and either buy new properties already built or develop the land within building regulations as stated in previous chapters. Those regulations were nationalised by the Ministry of Municipal Affairs in all Saudi cities. Through this, most cities became the same and local identity was lost in most. Al-Madinah became similar to other cities except for the view of the Prophet’s Mosque (PBH) that appears from anywhere around the city spectrum. Residents who live to the south of the Prophet’s Mosque (PBH) and outside King Faisal Road (the first ring road) were used to seeing the Mosque and Ohod Mountain. It is considered to be a mountain from Paradise, but they now do not have these views because of high rise buildings in the Central Area.
New residential districts changed because of the transformation of the process and techniques of land subdivision, and concepts of neighbourhoods were both changed. Neighbourhoods were transformed in Al-Madinah’s new urban areas. They were designed by surveyors, civil engineers, and un-professional architects who copied some imported theories and models. Even the copy was not as good as the original, nor well applied to fit local needs and characteristics. Some followed the high-rise building model. After the oil era in the seventies economic growth led to fast urban growth. Local professionals were not capable of managing and guiding that vast development. And practitioners were imported to consultant’s offices and local governments. Most were from Muslim Countries because Al-Madinah is a holy area where entry is allowed only to Muslims. However, often the people who came for the jobs were not the best qualified and they practiced western theories as they understood them in both architecture and urban planning. In some cases inadequate professionals were in challenging positions. Civil engineers, surveyors, and landlords interfered in the designing environment. The result was unrelated environment which looked modern, with priority given to traffic and the most saleable land reflecting the landlord’s interests. Development was fast and vast; there seemed to be a hunger for the development of natural vacant lands. Even plots between urban lands in traditional neighbourhoods had new concrete buildings with no harmony or unified form. The transformation from traditional to modern neighbourhoods passed through three stages. Each stage had a unique form of transformation and transforming among people and the life they used to have. They are as follows and shown in Figure 5.12:

5.5.1 Cluster of dwellings as High-rise Building (1970's) instead of 'Hoash'
This type of building regulation was set during the economic growth of oil revenue at that time. It was seen as a good proposal for investing money in multi-story buildings and multi-dwellings, especially after REDF loans started. Some designed multi-story buildings as clusters of dwellings. The rest invested all they had in a single dwelling in multi-story buildings on very small plots. Subdivision of lands did not yet have a constant form. Large areas were mostly sub-divided personally by landlords. They were not well educated either in terms of Islamic law or in terms of architecture and planning. Even decision makers who practised the profession of land sub-division were imported surveyors, civil engineers, or non experts who could not afford jobs in their countries.
This form of land sub-division can be seen between the first and second ring roads. At this stage there was a reshaping of traditional neighbourhoods from Hoash to multi dwelling buildings. This transition seems like pulling up the Hoash (traditional cluster of buildings) from its end and letting the gate stick to the ground surface. It is the change from horizontal clustering of buildings to vertical one. ‘Flipping’ was from horizontal neighbourhood to vertical cluster. Courtyard space, which was shared by residents as shown above, fragmented or leaked during this modification between elevators, bath ways, and stairs spaces and then evaporated and was wasted. Social relationships between residents remained limited unless they were relatives or friends before they moved into the dwellings. Despite the design quality of the dwellings, the clusters in general lack shared space for all residents and buildings are like prisons, especially for children and elderly men. In such dwellings, going out is very risky because of road traffic accidents and another risk for children is falling from windows while they are looking out. Shaded car parks may be available, but not playgrounds nor open spaces. The 1970’s was the age of transformation from traditional Hoash and houses to high rise buildings and apartments. It was the age of transformation and transforming. Transformation was from building materials such as clay and wood, which were soft in nature to very rigid, tough, to sharp ones, like concrete, iron, and glass. Transformation was from arches and curved lines of architectural design to simple, basic, abstracted and straight ones. Transformation from dwellings opening onto the Hoash via doors for children, boys, and elderly, and to the sky by the roof floor for girls and women to apartment dwellings in which everyone is boxed and do not have accessibility to either open land or the roof floor without risk. Activities in the living room consist of watching TV and video players or playing with electronic games. Transformation from house to apartment wasted the open space. The farthest dwelling from the Hoash's gate became the farthest one from the land surface. It means elderly people stay there, or near the lifts if they are not in order or if there was no electricity. Others who have plenty of shopping have to use the stairs to carry everything. Transformation changed the neighbourhood from one group of houses around one flat open space, to singular separated neighbours on each floor.

Transformation Occurred not for those who lived in that era but the new generation who grew up in the built environment. Children, who watch cars from windows, fight or play football virtually in play-station games; if they went out to play real football in the streets they faced danger from cars. Thus, they tend to the damage cars of their
neighbours, either by letting down the tyres or scratching the paint with sharp objects. It is not because they hate their neighbours, but psychologically hate the dangerous “car” that threatens them and limits their enjoyment of playing. Another example is an advertisement for flooring which was sent to the researcher via email. It shows a bedroom floored with sand and a toilet floored by grass as shown in Appendix (No.5.3) (http://www.floorshop.com/2005). Even if the traffic was not that heavy and the street is vacant, the pavement and asphalting made them feel that space was allocated to cars and is not suitable for playing. Moreover, asphalt is very hot, hard, and very dangerous if you fall over on it. Transforming affected people’s customs of welcoming neighbours as women or men did their chatting and children their playing in the Hoash, outside the house. They avoided having strong relationships as each family worried about making a playground for children and having the consequences of those activities inside their own dwellings. Transforming changed them from neighbours to unsociable dwellers. The transformation meant people went from being free to being imprisoned. If children commit minor crimes such as scratching cars’ paint, applauding for chasing cars, fighting with strangers in the street, should they be reproached for the transformation and transforming they did not choose?

On the other hand, most of the early buildings on the central area preserve the traditional characteristics of Islamic and local architecture of Al-Madinah. However recently new buildings start to appear in new designs and look very strange in between the old buildings. New buildings are mostly covered by glass to allow for good views. Other building materials used are suitable for Al-Madinah’s traditional form of architecture. Capitalism and globalization did vast change in Al-Madinah city centre and their examples of results are in the Holy area neither with respect to building regulations nor to local culture and identity.

5.5.2 Transformation to grid iron system of subdivision (1980’s): ‘Smash and grab’

It was the era of the grid iron system which started in Saudi Arabia in the late seventies. Blocks of plots were surrounded by streets. Most of these sub-divisions were drawn up by new Saudi consultants and architects in the Municipality but they were not very experienced and had been educated in theories of new cities by those same imported staffs. The form of sub-division is common in all ring zones. Outside the second ring road each plot is left to have only one villa. Spaces are left around buildings as setback
from all sides regarding the municipalities building regulations. The transformation was from a neighbourhood by cutting the *Hoash* from the middle into two rows of houses, and then sticking them together back to back with no open space between. In this case, open space fragmented from semi-public ones in the *Hoash* to smaller and purely private space indoors, and public areas for car traffic. The transformation was from urban shared space in a *Hoash* to architectural and purely private space. The transformation was from attached houses to detached villas, or with four dwellings. Consequently, neighbour's relationships were fragmented and became weaker. Children were kept inside the plot walls because of the traffic risk outside. Despite negative points of the grid system and even when T junctions were adopted as a solution for car accidents, the risk of car accidents for children was still there because of through-traffic systems. The result was to block off attached plots, but detached villas and consequently detached relationships were the result. Separation of the open space is a separation of the relationship between neighbours. Nevertheless, it is worse than the apartment dwellings where neighbouring occurs more. Villas are completely separated. When we were children we called friends who lived in the apartments 'boys of apartments' which means that they were less experience and knowledge of boyhood life outside the dwelling and that they are very spoilt. However the case was even worse in the description of villa boys. 'Villa's boys' means that they were very rich and spoilt; those who have everything inside their dwelling but have no friends or relations. The change was in sequence of processes in both built environment and society. Both processes of previous transformation and this one are the same in term the effect they did by of globalization. The first held up *Hoash* 'neighbouring units' high and let society to forget what was there on the ground. Then, this stage of transforming threw it down to fragment it into separates parts and to swallow it as an easy bit for the hunger of globalization all over the world, and Al-Madinah was a part of such globalisation. Kossler states that a full understanding of a new society is not possible without its references and characteristics of exact aspects (Schuurman, Albrow et al. 2000). The same, and additional transformations, will occur for new generations and there will be a lack of open space for real activities and neighbourly relationships. As the researcher remembers, younger boys at that time had to go far to find football playgrounds. Most were near the Islamic University, but now, they have been developed. The question here is about children and the elderly, and where they can go to undertake the activities they enjoy?
A citizen of Al-Hamoodi describes how they play and states:

'those children playing on streets because there are no playgrounds and one of their games is to steal car’s contents.' (Al-Hamoodi 2002)

Figure 5.12: Transformation from Traditional Hoash form of Neighbourhood to Modern ones

High rise building, grid iron pattern, and Cul-de Sac pattern of subdivision, shown above as Ahwash Al-Madinah as traditional neighbourhoods units.
5.5.3 Transformation to Cul-de-Sac system (early 1990's) re-organizes dwellings

The Cul-de-Sac system is called in Al-Madinah Municipality the Ahwash system because of the similarity between the shapes of spaces with only one entrance. However, stories of both are totally different. A Cul-de-Sac is ‘a passage with only one outlet, as a street closed at one end or a blind alley’ (brainydictionary 2001). Moreover, it is for cars to turn around and park in. Additionally, they do not have playgrounds which are safe and secure for children and for elderly men. However, it is better than the previous grid iron and T-junction forms of sub-divisions. Thus it was recommended by the Ministry of Municipal Affairs when the researcher was a planner at Al-Madinah Municipality. By the mid 1990's the Ministry recommended a loop concept. It was what planners there were instructed to do by managers, but no approved publication was received giving these recommendations. The pressure of capitalism was the main cause for the shift from the concept of the Cul-de-Sac to the loop one. Because of that, prices of plots in a Cul-de-Sac were equal to only 30% of plots on street, which meant low profits for landlords or developers. The idea of the Cul-de-Sac is a western one but, Kaki (1990's) proposed to be used as a similar form to ‘Hoash’. Moreover, in most cases the Cul-de-Sac is not large enough for turning around rescue vehicles. On the other hand, a Hoash is opposite as shown above. Even in the case of slow movement of cars, children cannot be watched from windows because the plot walls act as barriers to the view. Neither is its pavement, which is mainly asphalt, adequate for children playing. The transformation here is from private space to semi-private space in the grid iron concept to semi-public one in Cul-de-Sac one. Thus, Cul-de-Sacs do not offer an open space for a social neighbourhood but for clusters of cars parking between buildings. The researcher noticed one case in 1993; there was a party with the gathering inside the Cul-de-Sac and people seated on carpets on asphalt on which the men sat. Cars were kept outside it. It seems it satisfies this function of gathering but only if residents' relationships are strong enough to have agreement to do so. After eight years, and when the researcher did his field work, he discovered that most of the residents of this Cul-de-Sac are brothers and cousins of Al-Zaytooni's family. Therefore he called that Cul-de-Sac 'Hoash Al-Zaytooni' as it is known in Islamic districts where the name of districts was called after the head of the tribe, the resident's origins, or their profession as stated by Akbar (1998). Moreover, it has been
shown by Hakim in Conference\textsuperscript{6} (2004) that some students propose a very simple solution, to change Cul-de-Sacs from semi-public space to semi-private ones by installing a gate at the entrance. It is simple but effective in changing the responsibility from the public sector to residents, they then feel it belongs to them and they can become involved in decision making among neighbouring groups to reshape it to suit their needs and activities. Residents should have good relationships in order to get complete agreement. Hakim states that if the community has the will, then it will find the way (Hakim 2004). Yet, as mentioned above, the first neighbourhood of the Prophet (PBH) directed that relatives should be gathered as one unit of neighbourhood, and other tribes should do the same in the lots he (PBH) granted for them.

5.6 From courses of Traditional Hoash to manipulation of contemporary district to achieve neighbourhood unit

The courses above show that open space, which was purely private for residents of surrounding dwellings, has been lost in the contemporary built environment and modern subdivided plans. Through this, the benefits and responsibilities of belonging to a neighbourhood are lacking. Vast developments, roads for cars, building materials, imported professionals and theories interrupt the process of local planning and subdivision. Cars are a threat to children and the elderly, who become prisoners - performing their activities in a cyber world. Relationships between neighbours have changed with regard to the effects of the modern built environment on their behaviour. Other social problems similar to those in most world cities arose. It seems that open space is the primary reason for these activities; it allows relationships between neighbours; they feel increased belonging to their own community; they reduce negative behaviour and increase the responsibility of residents in dwelling units towards their neighbourhoods.

Simple treatment for these urban problems and their socio-economic consequences are proposed to afford open spaces between dwellings in the non-built plots. Each form of subdivisions and their building codes have their own treatments but this will be after analysis of the satisfaction of residents in regard to their districts and dwellings. This will be examined in the next chapter.

5.7 Summary:

As shown above, Al-Madinah had a unique and traditional form of neighbourhoods. Neighbourhoods were gathered groups of dwellings around open spaces and they were called ‘Ahwash’ or Hoash in ‘single’. They were open spaces used for multi-activities by residents of all ages, from children to the elderly. Original they were sourced from the first formation of Islamic community unit of the neighbourhood by Prophet Mohammed (PBH). Evidence of fellowship in such urban forms has been given above in the number of houses per Hoash, its size, and the model of the relationship between the number of houses per Hoash and its area. It was a course from traditional architecture and planning systems and relied on its culture, laws and social norms. King (1998) quoted on the cover of his book that Al-Madinah and Makkah have been most naturally and directly exposed to foreign architectural influences (King 1998). Globalization, nationalization, and generalization worked against the locale in Al-Madinah as in most of the worlds’ cities. Transformation effects were mostly on neighbourhoods which have been massively disrupted. The environment has been totally transformed by the global system of urbanism and building regulations. Architecture of old buildings, either villas or high rise ones, are affected because of a lack of experience amongst local architects who misunderstand local identity and its characteristics and like modern architectural schools. Through this, buildings have been changed. This has a socio-psychological effect on residents. Kaki W. quotes how traditional views impacted on those living in the past and living in the recent new developments (Kaki 2000). Locale is so sensitive and local identity is a part of Islamic culture. The built environment has an effect on residents and on their culture, as shown above how generalized building regulations affected neighbouring relationships. The defect was in lack of space which is found in most urban poverty in modern districts or neighbourhoods. The wisdom is shown in our traditional neighbourhoods and its sources from God’s Apostle Mohammed (PBH). Globalising is an essential in terms of communications and information systems and these can help in handling data for decisions supporting neighbourhood planning. However models and software should be adjusted with local measures to fit local requirements and needs regarding the resident’s social and economic characteristics as shown in later chapters. It seems globalization affects deeply physical forms of neighbourhood planning in Al-Madinah. In early times, it flipped traditional neighbourhoods from horizontal to vertical ones. Then, it smashed, grabbed, and then reorganized them.
Chapter Five: Traditional Hoash and open space

Policies and regulations of built environment should be made in reference to:

- Sustainability of contemporary built environment should be designed with traditional Islamic neighbourhoods in mind. Courses can be undertaken according to results of evaluation, analysis; goals and policies which have been written to sustain the coming generations; and tools and methodologies to achieve such goals which have been set (Hakim 2004).

- Thus, from the above findings, it is now easy to extract measures for a neighbourhood. The ideal number is shown in the figure above and with regard to the Prophet’s sayings ‘Hadith’, is forty dwellings for neighbours. Every resident is recommended to be kind to each other and enjoy good relationships as neighbours.

- Open space is an important part of the urban form for the residents of any neighbourhood. So, planners who will deal with new developments and subdivisions in Al-Madinah should provide an open space or courtyard shared by a group of forty dwellings for better neighbouring and liveable environment the same as the ‘Hoash’ used to be.

- The area of open space is regarded to the equation shown before, which is to allocate the size of a courtyard required for the number of dwellings; this can be applied to future subdivision processes to give the area size of open space needed for a given number of dwellings.

- Fourteen is the constant in the equation and the mode of number of dwelling in traditional neighbourhoods can be considered a maximum number of attached plots to set a street or path way.

- Such measures based on the results of the next chapter will be guidance for planning and building regulations to enable residents to live in their own homes and within neighbourhoods which they can belong to.

The results then may be valuable urban-design guidelines which fit with urban cultural values, roots, and traditions. These guidelines will be used as modern building regulations to form a new urban planning policy. The new policy will be a flexible one in terms of enabling, but not controlling as the old system was. It will also afford private ownership in a better quality of dwelling which can fit dwellers needs and requirements as will be shown in the next three chapters.
Chapter Six: Contemporary Neighbourhoods and Satisfaction

“I want my children to be able to meet and play and communicate with many other children on their own, not only when they are driven somewhere. I want them to grow up in an environment that is not just a place where people sleep but where people work... and where people enjoy themselves.”
(Moshe Safdie)
6.1 Introduction

Previous chapters have shown that traditional neighbourhoods are completely demolished. Thus, patterns of built environments are either new districts of 'planned' or informal areas. Informal areas are illustrated with four examples in chapter two. This chapter shows satisfaction levels among residents within Al-Madinah in both planned and informal districts. These patterns differ in urban characteristics. On other hand, they also differ in the amenities they have. Informal areas are seen by residents as neighbourhoods they belong to and which needs better developments because they lack some amenities.

By contrast, they are seen by others as slums and bad environment to live in. Governmental organizations and the municipality do not neglect informal areas, nor overdevelop planned areas. They influence the rapid development rate that has occurred in Al-Madinah and high demands of services and amenities. In both informal areas and planned areas, the meaning of neighbourhood is missing not only because of the urban form of neighbourhoods, but also because of the social characteristics of people who live now in such districts. Road networks separate residential blocks from each other. Asphalted open areas do not afford open space for residents' activities, especially that of children. District amenities are required by residents in each part of the city. Residents differ in amenities according to the district they live in. Some factors affect a resident's social and economic characteristics. Others are urban factors.

Satisfaction studies in this chapter are very important as they give an indication for the priority and quality of developments which should be afforded to residents. In previous chapters it is shown that traditional neighbourhoods have specific characteristics which make the word 'Neighbourhood' meaningful, but could modern ones be called neighbourhoods? Then, should modern forms of land subdivision be physically treated as traditional ones? In this chapter, satisfaction of residents is examined and analyzed to show their stress in terms of lacking amenities. Moreover it illustrates which form of neighbourhood plan subdivision should be used and gives priority for upgrades if the areas are still in the form of fragmented plots around a semi-public space. If the areas are transformed to semi-private ones then residents have the responsibility to make the neighbourhood work as stated by Henderson and Thomas (1980).
6.2 Amenities and Services in Modern Neighbourhoods

Al-Madinah was surrounded by farms within walking distances from residential areas, and these were used as sport and recreation clubs in the inner districts. Three decades ago the researcher and his brothers and cousins used to be guided by their fathers to the nearby farms: to pick fruits (such as grapes, figs, dates, and limes) and to swim in the farm’s pool and the charge was a few Saudi Riyals (one British Pound). Akbar (1998) states this saying that Al-Madinah was surrounded by palm orchards that have gradually been transformed into built areas and continues to change today. Most of those farms were eroded by the urban expansions and the new built environment is generally seen as a rigid one. Trees stood around houses and open space lay between houses and the mosque. From the memory of the researcher, Figure 6.1 below draws up how children used to play many games in open spaces between buildings. One was playing with a swing, which hung between two trees. Others were climbing curved trees. It was in Harat Al-Magharbah district, which was before the farms belt areas in south east of Al-Madinah at 1970’s.

![Figure 6.1: Harat Al-Magharbah and how children used to play within open space of old districts, small shaded area of trees was a play area and life zoo of birds and goats](image)

The district was not a traditional neighbourhood but it was a transitional one. Roads were very narrow. Cars had no access or were very limited. Ownership of cars in the 1970s was very low. Most residents used public transport on the main street ‘Quba’a Road’, and walked to their homes. Houses were very small for a family of eight members which was common and most families were around the same size. However,
Chapter Six: Contemporary neighbourhoods and satisfaction levels

the family moved to a bigger house, located two doors away. Neighbours were important for mother, safety was important for the six children who enjoyed playing with the neighbour’s children within the open space between houses. The courtyard house was important, especially for those who had goats. It was either beside or at the back of the house. But life was more exiting in Ahwash those were traditionally built with an enclosed open space for residents. *Harat Al-Magharbah* ‘Moroccan’s District’ and other old transitional areas had the same social life within the open space from traditional ‘Hoash’ before splitting the urban pattern by subdivision system with setback regulations between dwellings and car roads between blocks of plots. The researcher’s family moved to live in a traditional house which was on *Al-A’nbariah Street* in Old Madinah. The researcher lived in a house on the street but belonged to *Al-Johari Hoash*. He memorized all that said above about Hoash as a traditional neighbourhood. Then his family moved to a courtyard house which was located in an informal area. Here where the different of social cohesion appeared. Car’s streets separated most houses from each others, playing was inside house mostly and friendship is weaker that before in Al-A’nbariah house and neighbours there.

The social relationships had changed between residents of Al-Madinah because of urban pattern as shown before in chapter five. The neighbourhood courtyard or Hoash played an important role in childhood life. The recent neighbourhoods are very dangerous for children and elderly people. They both lack real life in their neighbourhoods and the city. They both are prisoners of boxed dwellings and if they are lucky and have courtyard houses then they have to live a lone. The demolition of such neighbourhoods and traditional houses wasted the courses of neighbouring that been associated with the urban pattern was there. The transformation that happened to Al-Madinah missed the course of ‘Hoash as urban neighbourhood planning’, and lacked of open spaces for residents who are recently over crowded neighbourhoods or fragmented ones.

Between 1982 and 1988, a sincere Mayor of Al-Madinah Omar Ghadhi who decided to solve such problems by designing district parks. He was even designated the ‘Parker Omar’, by unfriendly critics. Instead, he might be proud of that regarding the benefits those residents had of those parks. Such facilities partially solved many social problems for people, especially children, women and elderly who were caged in apartment dwellings at that time. As an example, when the researcher was in secondary school (two decades ago), he, his brothers and his neighbour’s friends tried to straighten a
rough vacant plot as a playground for football instead of using an asphalted triangular one in Ardh Al-Kordi. A few months later the municipality sent their labourers with bulldozers and prepared a football playground with goals’ frames, and beside that they asphalted an extra basket ball playground. Of course, boys of Ardh Al-Kordi district were very happy and all the others even from outside that district were attracted to this area. This open space became more social for them. They used to play football between 4:00-6:00 pm. After praying at sunset ‘Maghrib’ prayer (6:30 pm) they gathered again playing with bikes, or sitting, chatting, telling stories, cooking sometimes until late (12:00) especially during summer holidays. This was for young boys, but girls and women had their fun and enjoyment at that time inside houses, or in the park. The Municipality designed and implemented a local Park with birds and animals, sitting areas and free access. Most families living in districts of high rise buildings were attracted. Happiness was for all children and their mothers.

Unfortunately, Omar was no longer a Mayor of Al-Madinah. He became the mayor of Makkah Municipality. Consequently, most of those parks were demolished, ignored, shifted to other uses, or privatized and sometimes entry payment is charged. But the same residents who were happy in the district of Ardh Al-Kordi are not now, as a main road is proposed (Mid Ring Road) and the park has been shifted to another area, and the area of play grounds was cut by the road and the rest is not big enough even for one playground. Most of the neighbours’ children who played there now usually sit on stairs near that area with no activities except watching cars on that wide road. The lucky households and wealthy ones chose to have their own villas with large private courtyards. The middle class either pays for their entry for public parks, or rents a private chalet for 100 pounds/day or night (12 hours from 6:00 to 6:00) for their activities: swimming, playing, gathering with families. But the poorest class stays at home; their children play on vacant land if there is any nearby. Even if they an area to play after they prepare it as a play ground, it might be walled or fenced either by the municipality or landlords. Effect of such recreational areas in that districts is evident to that the built environment directly and indirectly affects and is affected by societies behaviors and attitudes as Aal-Haram (2004) states. Evaluation and analysis of current districts are shown below are as other evidences for poverty or richness of our neighbourhoods, its recreational function, neighbourhood relations and children’s behaviour (Peil, 1982).
Urban districts occur in two main forms—either in planned areas (private plans, and governmental grant schemes plans), and informal areas which are mostly occupied illegally or informally. Such open spaces only exist in a few new governmental plans and informal areas but in most private plans they are ignored and so are the social requirements of the future residents. “On street” plots have higher values than the ones on walk ways, courtyards, or culs-de-sac. This means that most plots in private neighbourhood plans are on streets, and thus courts and culs-de-sac are not preferred by developers. In terms of amenities and the basic services, informal areas might be luckier than the planned ones, thus Al-Fozan (1993) says in describing differences between old and new districts—in Riyadh—in the following:

‘The biggest evident is that, those old districts—which been left by residents those moved to new ones—have the best sanitary network, rather than they have availability of network extension in anytime, other new ones lack such services’. (Al-Fozan 1993: 92)

Neither modern patterns of houses, wide roads, a lack of services, nor poor quality of houses and narrow roads satisfy the life quality that residents expect. Both informal areas and planned ones should be considered in terms of their amenities and quality of life they provide for local residents in all status groups. Thus, Eben Saleh (2001) states:

‘The urban planning profession seeks genuine improvements in the quality of life, which are very necessary to a society in rapid change. There is a need to develop a planning and urban theory supported by suitable development controls which will generate and regulate an urban environment more suited to offer residents comfort at all levels, admitting that there is currently a schism in the planning and design process between vernacular and contemporary design of residential neighbourhoods’. (Eben-Saleh 2001: 189)

Yet, urban planning is to provide better quality of life for society during the development and urban change. In contrast, the need for support of theory is not by developments controls those cause fragmentation of development, but with more flexible regulations to consolidate developments and urban form. To measure such amenities and services and to allocate various standards which might fit all resident’s needs within neighbourhoods of both informal and planned areas, one should analyse samples of resident’s satisfaction among different neighbourhoods in Al-Madinah.
Despite a few District’s Centres which have been established by A-Madinah Welfare Society for social services many other districts are still lack such amenities. In general, most lack open space and its hierarchies, and finance matters related to rental value, land prices and loans as shown in Table 6.1. But for a better overview and analysis of good relationship of factors and variables of research questionnaire, it should be classified in every type of amenity and its associates. Thus, discussions and analysis using SPSS are as shown below.

6.3 Satisfaction factors upon Amenities and services in Districts:

As it is shown in chapter three satisfaction levels of residents will be used as indicators for efficiency of current neighbourhood planning. Moreover, these indicators are used to measure amenities that are lacked within neighbourhoods or districts examined. Al-Madinah residents mostly live in districts outside the first Ring Road ‘King Faisal Road’. Satisfaction levels differ regarding the form, pattern, and amenities within those districts. They differ inside the Ring Road’s zones. Most of those living between the first and second ring roads have access to services and amenities. However, those who live outside the second ring road may lack of services or amenities.

The most significant of the neighbourhood’s amenities and services are shown in tables in Appendix No. 6.1 for ANOVA tests. Confidence regarding the distance of prophets is very high and significance is about 0.001. This is because most of the municipal efforts and concentration of funds are directed to the central area that surrounds Prophet’s Mosque. Evidence from 267 families gives a wide range of how neighbourhoods function with their amenities and services. Not all of sample families have children thus satisfaction may be higher than expected in issues related to activities of children. It is found there is high dissatisfaction regarding the quality of neighbourhoods, open spaces and recreational activities. Neighbourhood functioning affects satisfaction with amenities in the few variables of cultural, social, economical, and urban characteristics. The factors those affect level of satisfaction are shown below and satisfy significance of less that 5% in ANOVA one-way tests.
Table 6.1: Means of Satisfaction levels regarding neighbourhoods and its amenities

<table>
<thead>
<tr>
<th>Issue, Services in Neighbourhood</th>
<th>Amenity, Satisfaction Mean</th>
<th>Issue, Services in Neighbourhood</th>
<th>Amenity, Satisfaction Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance to Local mosque</td>
<td>4.76</td>
<td>Transportation Costs</td>
<td>2.85</td>
</tr>
<tr>
<td>Access to local Mosque</td>
<td>4.65</td>
<td>Possibility of Extension</td>
<td>2.78</td>
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<tr>
<td>Water Service</td>
<td>4.38</td>
<td>Road's Safety</td>
<td>2.75</td>
</tr>
<tr>
<td>Mosques Availability</td>
<td>4.28</td>
<td>Access to Recreational Areas</td>
<td>2.74</td>
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<tr>
<td>Telephone Service</td>
<td>4.17</td>
<td>Telephone Calls Cost</td>
<td>2.69</td>
</tr>
<tr>
<td>Electricity Service</td>
<td>4.11</td>
<td>Availability of Mail points</td>
<td>2.64</td>
</tr>
<tr>
<td>NHD's Safety and Security</td>
<td>4.06</td>
<td>Furniture Cost</td>
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<td>Access to Prophet's Mosque</td>
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<td>Gathering Place</td>
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</tr>
<tr>
<td>Water Cost</td>
<td>3.94</td>
<td>Access to Mail Points</td>
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<td>Open Areas Availability</td>
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<td>Access to Schools</td>
<td>3.72</td>
<td>Street's Asphalting</td>
<td>2.57</td>
</tr>
<tr>
<td>Distance to Health Centre</td>
<td>3.69</td>
<td>Electricity Cost</td>
<td>2.55</td>
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<tr>
<td>Boys Schools Availability</td>
<td>3.69</td>
<td>Services Costs</td>
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<td>Monthly payback</td>
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<td>Distance to Prophet's Mosque</td>
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<td>First Payment</td>
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<td>Access to Shopping Centres</td>
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<td>Loan's Period</td>
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<td>Girls Schools Availability</td>
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<td>Loan's Terms and Conditions</td>
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<td>2.25</td>
</tr>
<tr>
<td>Enough of Shopping Areas</td>
<td>3.50</td>
<td>Landscaping and Vegetation</td>
<td>2.22</td>
</tr>
<tr>
<td>Street Lightening</td>
<td>3.48</td>
<td>Sitting Areas Availability</td>
<td>2.21</td>
</tr>
<tr>
<td>Sewage Efficiency</td>
<td>3.42</td>
<td>Bank's Loans</td>
<td>2.18</td>
</tr>
<tr>
<td>Smell Pollution</td>
<td>3.21</td>
<td>Garage Location and Type</td>
<td>2.18</td>
</tr>
<tr>
<td>Shopping Areas Design</td>
<td>3.17</td>
<td>Play Grounds Availability</td>
<td>2.15</td>
</tr>
<tr>
<td>Access to work</td>
<td>3.16</td>
<td>Interest Rate</td>
<td>2.13</td>
</tr>
<tr>
<td>Street's Cleaning</td>
<td>3.14</td>
<td>Parks Availability</td>
<td>2.08</td>
</tr>
<tr>
<td>Streets widths</td>
<td>3.08</td>
<td>Land-Values</td>
<td>2.08</td>
</tr>
<tr>
<td>Availability of Public Phones</td>
<td>3.07</td>
<td>Loans Availability</td>
<td>2.05</td>
</tr>
<tr>
<td>Noise Pollution</td>
<td>3.06</td>
<td>Construction Cost</td>
<td>2.03</td>
</tr>
<tr>
<td>Availability of Clinics</td>
<td>3.05</td>
<td>Play Areas Availability</td>
<td>2.00</td>
</tr>
<tr>
<td>Distance to work</td>
<td>3.04</td>
<td>Clubs Availability</td>
<td>1.98</td>
</tr>
<tr>
<td>Gathering Events</td>
<td>2.93</td>
<td>Walkways</td>
<td>1.98</td>
</tr>
<tr>
<td>Streets Layout</td>
<td>2.89</td>
<td>Parking Shading</td>
<td>1.71</td>
</tr>
</tbody>
</table>
6.3.1 **Urban Factors related to Satisfaction with Neighbourhood amenities**

- **Dwelling's Ownership**

Ownership of the dwelling unit is the factor that most affects satisfaction levels with neighbourhood amenities and services. Chi-square tests show that it has significant association with general factors, especially marital status; total monthly income; neighbourhood type; nationality and employment status. It also shows that it has significant associations with satisfactions of a neighbourhood's amenities and services. Ownership as a variable will be shown in the next chapter regarding its strong relation with dwelling quality and this chapter is for the neighbourhood quality. Dwelling ownership is classified into four types; personal or relative ownership; private tenant, public rentals, and others.

As shown in Figure 6.2, the majority are either private tenants; or owners or relatives of owners. Those who reside in dwellings rented from the public sector or employers are very limited.

![Figure (6.2): Ownership of dwellings](image)

Akbar(1998) defines ownership as - a legal unlimited control and holding over geographic boundaries regarding the owners requirements. It affects satisfaction because residents cannot afford adequate dwellings in the adequate district. At the same time, ownership is significantly associated with total monthly income of households. Thus, choosing the quality of a district where they will own a dwelling is related to income and both affect satisfaction levels with amenities and services.
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available in the district. Table 6.4 below shows Chi-square test of type of ownership and total monthly income of household. Moreover, regarding to Chi-Square tests for Ownership factors and satisfactions with a neighbourhood’s amenities and services shows that there are associations between dwelling ownership and the following neighbourhood amenities; distances to mail points and recreational areas; access to recreational areas, availability of mail points and clinics; street width and roads’ cleaning.

<table>
<thead>
<tr>
<th>Table 6.2: Chi-Square Tests of ownership and income total monthly income SR * dwelling’s tenure Cross-tabulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
</tr>
<tr>
<td>Pearson Chi-Square</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
</tr>
<tr>
<td>N of Valid Cases</td>
</tr>
</tbody>
</table>

- **Distance to Mail Points and dwelling ownership**

As shown below in Figure 6.3, Owners and private tenants are almost the same regard to the satisfaction level of distance to mail points. Those who are negatively satisfied are about double those who are positively satisfied because they live within a reasonable distance form mail points, where most of public housings are within the second ring roads. But, public tenants are totally satisfied. On the other hand, those who reside in dwellings rented from employers are totally dissatisfied, because hospital housings are far from the city centre and mail points as well.

In general and because of small ratios for both public and employer letting, only satisfaction levels of owners and private tenants will be considered here. Firstly this is to simplify analysis. Then, it is to simplify figures and to easy reading of charts as shown in the methodology of research. Last is to generalise satisfaction as either positive or negative while the dwelling hierarchy is varied

- **Distance to Recreational Areas**

Satisfaction regarding distance to recreational areas has associations with dwelling ownership. As shown below in figure 6.3, both owners and private tenants have almost the same trends of satisfaction either positive or negative. Moreover, both have positive satisfaction less than half of negative ones. In contrast, households in dwellings rented from the public sector or employer have more positive satisfaction levels. Same as above, it is due to location of dwellings and districts where they reside.
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- **Access to Recreational Areas**

Association is found between dwelling ownership and satisfaction levels regarding accessibility to recreational areas. More than 60% of owners and private tenants are dissatisfied as shown below in Figure 6.3. Tenant of employers are either dissatisfied with 40%, or satisfied with 60%. Public sector tenants remain positively satisfied. So, it is very clear recreational areas are lacking in the majority of districts of Al-Madinah, even in privatised areas. Thus, Makki who was interviewed in 2001 states that:

'Recreation areas were for public but mostly now been privatized, and public parks are ignored, play ground are mostly in vacant lands, but are not land zoned for playgrounds.' (Makki 2001)

- **Availability of Mail Points**

Change in satisfaction level regarding availability of mail points is not noticeable between those who are owners or relatives to owners; or private tenants of dwellings. But it changes remarkably in other types of tenants either public or employer’s. Positive satisfaction is still less than negative for both owners and private tenants. Tenants of employers are mostly satisfied. The figure below shows its trend with dwelling ownership.

- **Street’s width**

It is very remarkable in the figure below that there is an increase in positive satisfaction for both owners and private tenants. Owners still have more negative satisfaction than positive. Satisfaction levels with street width are acceptable in most districts except new ones where high dissatisfaction of owner’s mean that wide streets are very risky for children in districts.

- **Availability of Clinics**

As shown below in Figure 6.3, positive satisfaction is more than negative except in those who are owners or relatives of owners of dwellings where they reside. This means that most new districts lack clinics, because new owners mostly build in new districts. More increase in positive satisfactions for private and public tenants, and tenants by employer.

- **Street’s asphalting**

Owners who are satisfied are about one third of as those who are dissatisfied. But, private tenants are the same. While public tenants are dissatisfied, satisfaction of those let dwelling by employers are highly satisfied. This is because governmental housing projects are mostly well maintained regarding the street asphalting, but housing of the poor are in poor districts.
Figure 6.3: Dwelling's ownership and satisfaction level to variables those have significantly associated
Chapter Six: Contemporary neighbourhoods and satisfaction levels

- **Type of Neighbourhood**

Neighbourhood type is the second factor that affects satisfaction with a neighbourhood's amenities and services. Neighbouring types are classified into five types; detached; semi-detached; linked house; apartment in multi-storey building; and attached house. The chart below in Figure 6.4 shows that a minority are the attached houses which are from traditional neighbourhoods. Yet, this is ignored as very limited. On the other hand, the majority are in the form in apartments within multi-storeys buildings.

With regard to Chi-square tests, these types affect levels of satisfaction with the availability of the following amenities within neighbourhoods of Al-Madinah; clinics; Nurseries; play areas; playgrounds; parking; and walkways. Levels of satisfaction are the core evidence for lack of amenities and services within the district residents live in. Because clinics have been shown in a previous factor, they will be skipped here. Other variables not discussed above will have a brief analysis related to this factor.

- **Availability of Nurseries**

Satisfaction is recorded as either satisfied or dissatisfied only for simple analysis and graphing. The result chart is as shown below in Figure 6.4. The majority of those residing in Semi-detached dwellings are dissatisfied (90%). Others show less than 80% and more than 60% of dissatisfaction. Semi detached houses are mostly in informal areas, or in Housing Projects. In general, all of them are lacking in educational services.

- **Availability of Play areas**

As shown below in Figure 6.4, the majority are dissatisfied about availability of play areas. In general, play areas are mostly lacking in all zones of Al-Madinah. As shown in a previous chapter, play areas for children should be considered in all types of neighbourhood in Al-Madinah: high rise buildings, informal areas, or new districts of villas.

- **Availability of Playgrounds**

Playgrounds are also amenities that are lacking in most districts except in traditional areas. Yet the highest satisfaction is for those who live in attached dwellings in traditional areas around the central zone. The majority of 'those who are living in apartments' are dissatisfied with the availability of playgrounds as shown below.
Figure 6.4: Type of neighbouring and satisfaction to associated variables
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- **Availability of Parking**

As shown above in Figure 6.4, most are dissatisfied over availability of parking. Parking seems to be a major issue that planners should take into consideration for a modern city. Meanwhile, planners should consider parking as space for vehicles. Lack of parking led residents to build temporary garages in any vacant land or dead end ‘Cul-de-Sac’. Moreover, some tend to park under the shadow of neighbours houses to protect vehicles from the heat of the sun during summer. The subdivision pattern in most areas is only concerned with subdivided blocks of plots and surrounding wide streets. Figure above shows that evident to not satisfactory level in term of availability of parking.

- **Availability of Walkways**

Walkways are ignored in subdivision plans in Al-Madinah. It seems that while the car has been considered, pedestrians are neglected. Walkways beside roads and streets are used in all roads in most cities. But they are not considered to have especial pavement or landscaping to separate pedestrians from car traffic. Thus, dissatisfaction is very negative in all types of neighbourhoods. Those who like to walk for training or to lose weight are used to going to new areas where the streets have lights, are far from crowds, few cars, clean streets, and during the night have cooler weather.

- **Type of dwelling Unit** is another major factor that affects levels of satisfaction regarding a neighbourhood’s amenities. Households living in apartment, traditional house, or villa differ in their satisfaction in neighbourhoods. The table below shows the percentage of these types of dwellings.

<table>
<thead>
<tr>
<th>Type of dwelling</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat in Multi storey building</td>
<td>185</td>
<td>69.3</td>
</tr>
<tr>
<td>Traditional House</td>
<td>25</td>
<td>9.4</td>
</tr>
<tr>
<td>Villa</td>
<td>57</td>
<td>21.3</td>
</tr>
<tr>
<td>Total</td>
<td>267</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Types of dwellings will be explored in detail in the next chapter. Discussion here is only about how satisfaction regarding neighbourhood amenities and services is affected by the factor of dwelling types. The majority of dwellings are in the form of apartments (70%) which are located inside Second Ring Road, and partially outside. They are mostly located between the first and second ring roads. Villas occur mostly outside the second ring road. Traditional houses are mostly located in informal areas. Thus, each
type of neighbourhood differs in amenities and consequently so does their satisfaction. With regard to Chi-Square tests, dwelling type is significantly related to; distances to Prophet’s Mosque, and recreational areas; access to schools, recreational areas, and clinics; availability of mosques, sitting areas, parks, play areas, and parking; and street’s layout.

Variables discussed above will not be included here. Only new variables will be shown in analysis as follows:

- **Distance to Prophet’s mosque**
The majority of those who live in apartments are satisfied regarding the distance to Prophet’s mosque. This is because most apartments are within the Second Ring Road and not more than 5 miles from Prophet’s Mosque. Those who are dissatisfied seem to live in apartments or floors of villas outside the Second Ring Road and very far from the Prophet’s mosque. Those living in traditional houses, either in traditional neighbourhoods or informal areas, are satisfied by twice as much as those who are dissatisfied. Those who are dissatisfied may be living in distant informal areas such as around Ohod Mountain in the north. Those who live in villas are almost equal parts satisfied or dissatisfied. Those who are satisfied are those who live in villas within or around the Second Ring Road.

- **Access to Schools**
As shown in the chart in figure 6.5 below satisfaction level for this service is very high. The minimum level is for those who are living in villas. This might be due to those who live in new districts which are not provided with schools yet. Thus, people tend to stay in rented apartments which are well serviced by schools rather than build their own villa and lack accessibility to schools.

- **Access to Clinics**
Accessibility regarding clinics is highly satisfied. Again, minimum satisfaction is of those who live in villas. It is because they are living in new districts which haven’t been provided with clinics yet. But those are living in apartments are very satisfied because most of apartments are in multi-storeys building which are located within the Second Ring Road, and all these area are services by clinics and health care.
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- **Mosque Availability**

  As shown below, satisfaction is very high. As above, minimum levels are of those who live in villas. It is because dwellings within new districts have not yet been provided with mosques.

- **Availability of seating areas**

  Satisfaction here is very low. High dissatisfaction is shown by those who are either living in traditional houses, or apartments. The lowest dissatisfaction is of those who are living in villas. It is because they are living in the Housing Projects. Housing Projects are the only districts provided with seating areas.

- **Availability of Parks**

  As shown below dissatisfaction is very high in all types of dwellings. The lowest level is in those who are living in villas. This might be due to those who are living in a Housing Project with high satisfaction levels. Those either in apartments or traditional houses have the same levels of dissatisfaction.

- **Street Layout**

  Satisfaction level is higher in those who live in villas and apartments. It is higher in dissatisfaction than satisfaction of those living in traditional houses. Of course, they are within either traditional areas or informal ones. Both of them have narrow streets and some times dead ends. Though residents understand layout of routes is not accessible for cars they are still not satisfied. So, the modern designs and layouts of streets are ok but only for cars and only if they are well asphalted and maintained. Thus, future planning should regard both Modern Street layout and traditional open space for activities.
Figure 6.5: Type of dwellings and satisfaction to variables significantly associated
6.3.2 *Scio-Economic Factors related to Satisfaction with Neighbourhood amenities*

- *Household Income* is the fourth factor that affects satisfaction of residents with a neighbourhood’s amenities. It seems very rational that when one has low income a person will buy or rent a lower quality of dwelling and it might be in a lower quality of neighbourhood. In general overview summary table 6.3 below shows that mean of satisfactions vary through income groups. Only a minority are very dissatisfied. This level is only in groups 5, 7, and 8 and in total it is only 1.5%. About one fifth are fairly dissatisfied in general with a neighbourhood’s amenities and services. It is mostly in groups 6, 7, 4 and 5. More than one third of those are neutral. They are mostly in groups 6, 7, and 8. About a third is the ratio of those who are fairly satisfied and are mostly again in groups 6, 7, and 8. Less than one tenth is the ratio of those who are very satisfied, and mostly are in group 8, but spread over other groups as shown below.

Table 6.4: Summary of table of Cross-tabulation for NHD Mean of Satisfactions * Total Monthly Income SR

<table>
<thead>
<tr>
<th>Income Groups * Mean of NHD Satisfaction SR</th>
<th>Very Dissatisfied</th>
<th>Fairly Dissatisfied</th>
<th>Neutral</th>
<th>Fairly Satisfied</th>
<th>Very Satisfied</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 1,000 or less</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>2) 1,001-2,000</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>3</td>
<td>18</td>
<td>28</td>
</tr>
<tr>
<td>3) 2,001-3,000</td>
<td>6</td>
<td>11</td>
<td>4</td>
<td></td>
<td></td>
<td>21</td>
</tr>
<tr>
<td>4) 3,001-4,500</td>
<td>8</td>
<td>13</td>
<td>5</td>
<td>2</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>5) 4,501-6,000</td>
<td>2</td>
<td>8</td>
<td>9</td>
<td>9</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>6) 6,001-8,000</td>
<td>10</td>
<td>17</td>
<td>21</td>
<td>1</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>7) 8,001-10,000</td>
<td>1</td>
<td>9</td>
<td>15</td>
<td>3</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>8) More than 10,000</td>
<td>1</td>
<td>7</td>
<td>20</td>
<td>20</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Total No</td>
<td>4</td>
<td>53</td>
<td>92</td>
<td>83</td>
<td>22</td>
<td>254</td>
</tr>
<tr>
<td>%</td>
<td>1.5</td>
<td>20.9</td>
<td>36.2</td>
<td>32.7</td>
<td>8.7</td>
<td>100</td>
</tr>
</tbody>
</table>

Though income factors affect satisfaction related to distances to mail points and recreational areas; access to recreational areas, to work locations; and to shopping centres; sewage efficiency; shopping area design; street widths and asphalting; rent value; neighbour's race and neighbourhood's inner privacy, safety, and security.
Table 6.5: Total monthly income SR * more than one employees in household, Cross tabulation and cumulative % (Multi tables been summarized into one)

<table>
<thead>
<tr>
<th>Group No</th>
<th>TOTAL MONTHLY INCOME SR</th>
<th>NO %</th>
<th>YES %</th>
<th>Total %</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1,000 or less</td>
<td>4.5</td>
<td>1.8</td>
<td>3.4</td>
<td>3.4</td>
</tr>
<tr>
<td>2</td>
<td>1,001-2,000</td>
<td>9.1</td>
<td>3.6</td>
<td>6.8</td>
<td>10.2</td>
</tr>
<tr>
<td>3</td>
<td>2,001-3,000</td>
<td>9.7</td>
<td>8.2</td>
<td>9.1</td>
<td>19.3</td>
</tr>
<tr>
<td>4</td>
<td>3,001-4,500</td>
<td>10.4</td>
<td>11.8</td>
<td>11.0</td>
<td>30.3</td>
</tr>
<tr>
<td>5</td>
<td>4,501-6,000</td>
<td>13.6</td>
<td>9.1</td>
<td>11.7</td>
<td>42.0</td>
</tr>
<tr>
<td>6</td>
<td>6,001-8,000</td>
<td>22.1</td>
<td>17.3</td>
<td>20.1</td>
<td>62.1</td>
</tr>
<tr>
<td>7</td>
<td>8,001-10,000</td>
<td>18.2</td>
<td>14.5</td>
<td>16.7</td>
<td>78.8</td>
</tr>
<tr>
<td>8</td>
<td>More than 10,000</td>
<td>12.3</td>
<td>33.6</td>
<td>21.2</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The table above shows that residents' satisfaction in regard to neighbourhood amenities has a linear relationship with household income groups. Whenever income increases, the percentage of households who were questioned increases. About 42% of the total households have more than one income. But, 79% of Al-Madinah Residents are in groups 7 or less. This mean that the majority of Al-Madinah households earn less than SR10,000 monthly, or SR120,000 annually, which is about £17,143 (£1 = SR7, according to Yahoo/finance/ exchange rate at 11-Nov-2004).

Only one fifth of those earn more than SR 10,000 monthly. This group are targeted by developers as buyers for their developed dwellings, but the majority of them are still tenants of their dwellings. The rest should wait for REDF loans to build on their far plots from serviced areas, if they have one. Yet, group 7 is considered to be the cut-off point in income groups. The resulting figure show changes between satisfaction levels with neighbourhood amenities and services in regard to income groups. In terms of variables, these are affected by income groups,

Cross tabulation of satisfaction regarding the variables and associations with income groups show some valuable findings. They are aligned to each variable as follows:

- Distance to Schools

Schools are one of the main variables associated with income regarding satisfaction with districts or neighbourhoods which households of Al-Madinah regard as a measure for satisfaction with their location. It is because of the district design of traffic circulation and is very risky for children thus they tend to be taken by father, elder brother, or by domestic driver. Government schools do not provide a bus service for boys, but it is afforded for girls in some stages. Chi-Square tests show significant
association between distance to schools and income groups. The table below shows this.

**Table 6.6: Chi-Square Tests of cross tabulation of distance to schools and income groups**

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>47.579</td>
<td>28</td>
<td>.012</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>48.414</td>
<td>28</td>
<td>.010</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>3.397</td>
<td>1</td>
<td>.065</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>264</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Although, distance to schools is the real measure that the population care about regarding their children's safety and security, cost of transportation and ability to walk, especially during winter and summer.

**Table 6.7: Total monthly income (SR) and distance to schools cross tabulation**

<table>
<thead>
<tr>
<th>TOTAL INCOME SR</th>
<th>MONTHLY Very dissatisfied</th>
<th>Fairly dissatisfied</th>
<th>Neutral fairly satisfied</th>
<th>Neutral satisfied</th>
<th>Very satisfied</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 1,000 OR LESS</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>2) 1,001-2,000</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>3) 2,001-3,000</td>
<td>1</td>
<td>1</td>
<td>9</td>
<td>10</td>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>4) 3,001-4,500</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>14</td>
<td>6</td>
<td>29</td>
</tr>
<tr>
<td>5) 4,501-6,000</td>
<td>4</td>
<td>4</td>
<td>9</td>
<td>8</td>
<td>6</td>
<td>31</td>
</tr>
<tr>
<td>6) 6,001-8,000</td>
<td>6</td>
<td>5</td>
<td>10</td>
<td>26</td>
<td>6</td>
<td>53</td>
</tr>
<tr>
<td>7) 8,001-10,000</td>
<td>4</td>
<td>3</td>
<td>6</td>
<td>20</td>
<td>11</td>
<td>44</td>
</tr>
<tr>
<td>8) More than 10,000</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>22</td>
<td>22</td>
<td>56</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>26</td>
<td>48</td>
<td>108</td>
<td>59</td>
<td>264</td>
</tr>
</tbody>
</table>

The table above shows that satisfaction is not constant between income groups. It changes between income groups as follows:

- Within Group 1 (less than SR 1,000), there is no household who is very dissatisfied. Those having positive satisfaction are more than double the negative group. In general it has lowest numbers of those very dissatisfied and the lowest of those very satisfied.

- Within group 2 (SR 1,001-2,000), positive satisfaction is four times the negative one, and equal to those are neutrals. The same reasoning of the previous group may apply to this one too.

- Within group 3 (SR 2,001-3,000), negative satisfaction is less than a sixth of positive satisfaction, and less than a fourth of those who are neutral. Satisfaction is considerably high here because households of this group are either living in informal areas far from central areas such as those around Ohod Mountain, Ad-Dowaimah, Aj-Joboor, and Al-A’walai. Such areas are characterised with small amounts of rent, but are serviced by schools.
Within group 4 (SR 3,001-4,500), positive satisfaction is more than double the negative satisfaction. Neutrals are very limited. Thus, households of this group are either living within districts serviced by schools or new ones which have not been serviced yet. Examples of new districts are Housing Project, Janob Quba’a, and King Fahad Plan. But the majority are satisfied. This means that they live in old districts such as An-Nasor, Ardh Al-Kordi, and Al-A’walai.

Within group 5 (4,501- 6,000), negative satisfaction is less than two thirds of positive satisfaction and almost the same as neutral one. This group has a variety of households and districts they live in. They may live in new districts which have not been serviced yet; informal areas are serviced but some times the local authority can’t afford places for all children within the districts. Consequently they then go to the next district schools and are therefore dissatisfied with distance to schools.

Within groups 6 (SR 6,001- 8,000), positive satisfaction is more than three times greater than negative. Negative is almost the same as neutral. This group of households are those who live in old but well serviced districts. Examples are Ardh Al-Kordi, Al-Harrah Ash-Shargiah, and Al-Khalidiah.

Within group 7 (SR 8,001-1,000), about three quarters are positively satisfied. Those who are fairly dissatisfied or very dissatisfied are almost the same ratio, and together are about a quarter. Satisfaction here is higher. This is because households here may reside within districts with the best quality apartments. Examples of such districts are Al-Mutlaq, Ar-Rawdhah, Al-Hizam area, and Al-Faisaliah.

Within group 8 (More than SR 10,000), positive satisfaction is four times the negative and neutral groups together. It is the highest ratio of positive satisfaction within the groups, because the majority of them chose and own their dwellings in old districts which are well serviced by schools.

In a general view of all income groups, the highest dissatisfaction is in groups 6 and S. In contrast, there is no dissatisfaction in group 1 (less than SR 1,000). This means those in households who earn less than SR 1,000, but are singles and have separate dwellings within their family’s building, or who live in informal areas surrounding the central zone and provided with school services. But those who are neutrals are higher that satisfied or dissatisfied in groups 2, 3, and 5. The figure below shows this very clearly. Because of very complicated reading of the graph in figure 6.6, even when a bar chart is used it is still very difficult to read. Thus, categories of income are recorded for only
two and the cut-off point was group 7 as mentioned above. Moreover, satisfaction levels are also recorded as either satisfied or dissatisfied. So, the resulting charts as shown below in figure 6.7, are very simple and shows the general percentage of satisfaction between two main income groups: those who are able to build their own dwelling or those who can not according to their own total monthly income. Over 82% of those earn more than 10,000 SR monthly, and over 75% of those less, are satisfied regarding distance to schools. But positive satisfaction is generally more than negative one.

![Graph showing satisfaction levels by income groups](image)

**Figure 6.6: Linear graph of cross tabulation of Satisfaction of distance to Schools (%) and Income Groups**

This is because of the use of cars in most areas rather than walking to schools, especially for girls, and young children. Girls are cared for by society as they are females and weak (in regard of Saudi culture), and because of the traditional Muslim uniform or 'Hijab', it would be very hot for them to walk during summer. Young children are cared for by parents and protected from traffic risk, so that fathers or drivers tend to take their children to and from schools. Consequently, satisfaction is higher than dissatisfaction even when there are districts not yet serviced by schools.
Figure 6.7: Bar chart for Satisfaction Monthly Income with cut point group 7, and significantly associated variables
• Distance to mail points

Satisfaction regarding distance to mail points is one of the main issues that urban planning should look at. In Al-Madinah it is not common to have mail at your door. Either you will be called for collection, or you have a membership with a mail service and have a mail box in their mail points or centres. Change of satisfaction within income groups is figured in the bar chart shown below, and simplified in figure 6.7 above. Chi-Square tests table 6.6 shows that income groups have significant association with satisfaction of distance to mail points.

Table 6.8: Total monthly income (SR) and mail points Cross tabulation

<table>
<thead>
<tr>
<th>TOTAL MONTHLY INCOME SR</th>
<th>% Very dissatisfied</th>
<th>% Fairly dissatisfied</th>
<th>% Neutral</th>
<th>% Fairly satisfied</th>
<th>% Very satisfied</th>
<th>% Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000 or less</td>
<td>1.7</td>
<td>3.3</td>
<td>6.4</td>
<td>11.1</td>
<td>3.4</td>
<td>72</td>
</tr>
<tr>
<td>1,001-2,000</td>
<td>2.8</td>
<td>3.4</td>
<td>11.7</td>
<td>2.1</td>
<td>22.2</td>
<td>6.8</td>
</tr>
<tr>
<td>2,001-3,000</td>
<td>8.3</td>
<td>6.9</td>
<td>18.3</td>
<td>6.4</td>
<td>9.1</td>
<td>6.8</td>
</tr>
<tr>
<td>3,001-4,500</td>
<td>20.8</td>
<td>5.2</td>
<td>5.0</td>
<td>8.5</td>
<td>14.8</td>
<td>11.0</td>
</tr>
<tr>
<td>4,501-6,000</td>
<td>11.1</td>
<td>17.2</td>
<td>11.7</td>
<td>12.8</td>
<td>11.7</td>
<td>11.0</td>
</tr>
<tr>
<td>6,001-8,000</td>
<td>20.8</td>
<td>20.7</td>
<td>25.0</td>
<td>14.9</td>
<td>14.8</td>
<td>20.1</td>
</tr>
<tr>
<td>8,001-10,000</td>
<td>20.8</td>
<td>17.2</td>
<td>13.3</td>
<td>21.3</td>
<td>3.7</td>
<td>16.7</td>
</tr>
<tr>
<td>More than 10,000</td>
<td>15.3</td>
<td>27.6</td>
<td>11.7</td>
<td>27.7</td>
<td>33.3</td>
<td>21.2</td>
</tr>
<tr>
<td>Total No.</td>
<td>72</td>
<td>58</td>
<td>60</td>
<td>47</td>
<td>27</td>
<td>264</td>
</tr>
</tbody>
</table>

Table 6.9: Chi-Square Tests for Association between satisfaction regarding distance to mail points and income groups

<table>
<thead>
<tr>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>62.718</td>
<td>28</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>65.862</td>
<td>28</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>264</td>
<td></td>
</tr>
</tbody>
</table>

As shown in the tables above, main findings for this variable with regard to the income factor are as follows:

- Within income group 1, those households who are either fairly or very satisfied are six times greater than those fairly dissatisfied, and three times of those who are neutral. In other words, it can be said that those not satisfied are a third of total households with income less than SR 1,000. In general, their positive satisfaction is the highest of income groups. This because these groups either don’t use mail, or use it and live in informal areas where they are very near mail points in the city centre.

- Within the second income group, those who are very satisfied are equal to those who are neutral and those who are fairly or very satisfied are equal too. The minority are those who are fairly satisfied. In other words, those who are satisfied are
twice as numerous as those dissatisfied. This income group are always either non-Saudi labourers who use mail for international contacts and so they are very satisfied, or Saudi labourers those don’t have domestic workers who need mail, thus they are neutral. In general, this group is the second in terms of smaller ratio of negative satisfaction between income groups.

- Within group 3, the highest percentage is of those who are neutrals. Those who are fairly satisfied are only half of those very dissatisfied, and those fairly dissatisfied lie between them. Group 3 does not have any high satisfaction. Households of this group seem to be those who are employees with limited income, and who live in informal areas far from central areas such as those around Ohod Mountain. Such areas are characterised by small amounts of rent, but are far from mail points which are located in the central area. In general, it is also the third in terms of smaller ratio of negative satisfaction.

- Within group 4, those who are fairly dissatisfied have the same percentage of neutrals. But, the sum of both percentages of very or fairly satisfied is the same as percentage of households who are dissatisfied. In general, this group has the highest negative satisfaction. This is for the same reason as previous groups, but these groups may have domestic workers who do need mail, but they live in apartments far from the central area and mail points; or in informal areas with small dwellings, but nearby mail points.

- Within group 5, the percentage of those who are dissatisfied is twice those who are satisfied or neutral. This group of households seem to be those who have middle income, and mostly those who have graduated with bachelors degrees earn such amounts of income. However such a class of educated people are mostly looking for good quality dwellings and new districts, though they tend to have new dwellings but far from the centre. Consequently they lack mail points in such areas, unless they live near the central areas in old dwellings (not the very expensive ones), thus they are not very satisfied in terms of distance to mail points. In general, this group has a majority of households who are dissatisfied.

- Within group 6, those who are satisfied are two thirds of those who are neutral, and half of both of those who are either fairly or very dissatisfied. Households within this group of income are the highest in terms of single income sources. They are second in double sources of income. About two fifths of households in this group have two incomes. Generally they earn more than SR 6,000
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monthly. Such families may have dwellings in old districts but with good access to mail points such as Ardh Al-Kordi, or Ardh Al-Bahar districts, otherwise, they live in far districts such as Azizia and then they are very dissatisfied. Yet they have more in "very satisfied" categories than the previous group. In general they are the second highest group in very dissatisfied, and the third lowest in very satisfied in terms of distance to mail points.

- Within group 7, those who are neutrals are less than either satisfied or dissatisfied. Negative satisfaction is more than double positive satisfaction. Households in this group are considered as the middle class of income. A PhD holder with single income may locate in this group after the first three years of his graduation. They might reside in the best lease dwellings in Al-Madinah in the best areas. Such districts are either in high rise buildings or new two storey buildings with two dwellings. They are mostly located within the Second Ring Road, Main roads, Ar-Rawdhah and Al-Amir districts (behind Al-Amir furniture), or in Housing Projects. In general, a quarter of total residents of this group are satisfied about distance to mail points, but more than half are dissatisfied. This might be because two thirds of residents have a single income.

- Within group 8, about two thirds have multiple incomes. More than a third of households are satisfied in terms of distance to mail points. This means that they reside within the areas near the central one where mail points are located. About half of the households are dissatisfied. This group seems to be the highest one in terms of ownership of dwellings. They have the third highest satisfaction level and lowest dissatisfaction level regarding distance to mail points.

![Figure 6.8: Bar chart of satisfaction to distance to mail points marked by Total monthly income](image-url)
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In general overview Figure 6.8 above shows that each of the income groups has its own line of satisfaction regarding distance to mail points. The highest percent is of those who are dissatisfied is in income group 3, but groups 2 and 8 have medium percentages. The highest percentage of those who are satisfied is in group 1, and the lowest ones are in group 3 & 5, and group 9 have medium percentage. But there are dissatisfied majorities of groups who earn more than SR 2,000 monthly. Because the majority of those who use normal mail, and either are ethnic minority households or those here temporarily for work or study, or households with labourers, either domestic ones or drivers, or sales people at shops. As shown in figure 6.8 above, over 66% of those earning less than 10,000 SR, and over 55% of those earning more than 10,000 SR, are dissatisfied regarding the distance to mail points. In general, dissatisfaction is higher than satisfaction.

Urban planners of neighbourhoods should consider this issue as one of the main issues of a basic service until total adoption of electronic mail service 'email'. Mail points should be provided in all districts. If an area does not have a mail box, then a box to drop envelopes in will be enough and satisfactory.

- Street asphalting

Satisfaction with street asphalting reflects quality of districts and efforts of the municipality in terms of road maintenance. In general both groups of those who earn SR 10,000 and less monthly, and those who earn more than SR 10,000 have the same trend of satisfaction regarding street asphalting. Majorities in both groups are dissatisfied. The Municipality should give more attention to street asphalting in all districts. In a desert environment like Al-Madinah, roads not asphalted will cause damage to people and vehicles. Dust from such roads can cause accidents and hurts pedestrian's eyes and lungs. It is also scratches the paint and windscreens of vehicles. In all cases un-asphalted roads used for cars can cost dwellers of the districts either for health care or repair of their vehicles. In addition it causes air pollution that may reach adjacent parks or playgrounds. It is shown in a previous chapter that one of the main rules of Islamic law is 'Do not cause any damage'. The municipality should remember this issue in its intention to form urban districts for living in rather than approving plans and then not maintaining the roads.
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- **Availability of Walkways**
  As shown in figure 6.7 all income groups have the same trends of satisfaction and both have negative satisfaction regarding to availability of walkways. Walkways were only proposals, as shown before in Chapter Four, in a few researches and in academic classes, but in neighbourhoods plans they are totally missing. Thus, pedestrians and especially pregnant women have to walk in new areas not yet developed and where car movements are very limited. Moreover, neighbourhood relationships between neighbours are very limited so that there is no need for visits and walking for short distances except to the local mosque or shop, but people tend to use cars because of long distances to such services.

- **Availability of Gathering events places**
  Satisfaction with places for events is almost the same for both income groups. Dissatisfaction is as double times of satisfaction level. On the other hand with regard to the availability of gathering places, satisfaction levels are almost the same between the income groups, but the majority are dissatisfied as shown above in Figure 6.7.

- **Household size** is the fifth factor which has significant relationship with satisfaction of a neighbourhood’s amenities. Of course whenever the size of a household increases then consequently the need for more amenities increases. For example a family with two children may need only a nursery, but a family with six children may need at least two schools. Size of household is related to satisfaction with distance to local mosque; availability of nurseries, parks, and clubs and ample shopping areas. During author childhood, it was usual to send any child to the local shop to buy daily stuffs and bread because of safety and security. But now it is very risky to do so and sending a child who is a similar age to local shops while streets are full of cars is dangerous. Nevertheless, in some new districts, which are outside the Second Ring Road, shops near dwelling areas are limited. Yet, more risk in sending any child for long distance.

- **Nationality** is one of main factors associated with other factors within the variables of the questionnaire. Chi-square tests show that it has significant association with marital status; employment status; educational status; multi-income sources; total monthly income and employment status. It is also the sixth factor considered strongly in having a significant relationship with satisfaction with neighbourhood amenities. It has significant relation with satisfactions of distances to schools, shopping centres and...
health centres; access to schools and health centres; telephone services; availability of mosques and parking and neighbourhood privacy. Non Saudi labourers, especially singles, may face difficulties in finding dwellings to rent within new residential districts not because of racial matters but because of marital status. Thus, he may only find dwellings either in informal areas or poor neighbourhoods. While non-Saudis are only 7% of the population, they do not always have the same satisfaction levels as Saudi’s. Figure 6.4 shows how they differ in each satisfaction variable of neighbourhood amenities and services.

As stated above the value of ‘3.00’ is considered a neutral point and satisfaction level is considered positive when it is over ‘3.00’, and negative when it is less. The figure below shows that both satisfactions levels of Saudi and non-Saudi are neutral in terms of availability of clinics within neighbourhoods. When Saudi satisfaction is positive, level of non-Saudi’s satisfaction is almost always lower except in distance and access to Prophet’s Mosque; this occurs for shopping areas; transportation costs; sewage efficiency and electricity service. This might be due to the areas they are living in. Most non-Saudis live in informal areas located around the central zone as mentioned before in chapter two. Yet, they are near to Prophet’s Mosque. Nevertheless, most areas are well serviced in terms of electricity and sewage as mentioned before by Al-Fozan (1993). But, non-Saudis’ satisfaction is less than Saudis in general. But, non Saudi’s satisfaction is negative when Saudis’ level is positive in a few issues such as availability of public phones; distances to work, schools and shopping centres. These issues are because of their needs for making international calls; lack of schools because of over density in informal areas and no interest by developers to establish shopping centres within such areas. Yet, they are near to Prophet’s Mosque.

On the other hand, when Saudis’ satisfaction is negative non-Saudis’ satisfaction is always lower except in transportation costs; street asphalting; cost of electricity and availability of clubs. Again, it seems because of living in informal areas, most streets not have been asphalted or not maintained after a long period. Moreover, regarding their low income they care about costs of consumption of oil and electricity more than Saudi’s do. In general, non-Saudis’ satisfaction is not positive when Saudi’s is negative. Figures 6.9 above and Figure 6.10 below show this clearly.
Chapter Six: Contemporary neighbourhoods and satisfaction levels

Positive Satisfactions regarding to Nationality

- Availability of Clinics
- Distance to work
- Streets widths
- Availability of Public Phones
- Street's Cleaning
- Shopping Areas Design
- Access to work
- Sewage Efficiency
- Enough of Shopping Areas
- Street Lightening
- Neighbour's Co-operation
- Neighbourhood's inner Privacy
- Distance to Prophet's Mosque
- Distance to Schools
- Girls Schools Availability
- Distance to Shopping Centers
- Access to Shopping Centers
- Boys Schools Availability
- Access to Health Centers
- Distance to Health Centre
- Access to Schools
- Neighbour's Race
- Water Cost
- Access to Prophet's Mosque
- NHD's Safety and Security
- Electricity Service
- Telephone Service
- Mosques Availability
- Water Service
- Access to local Mosque
- Distance to Local mosque

Figure 6.9: Nationality and Positive Satisfaction levels through variables of Neighbourhoods amenities and services. Satisfaction means were calculated in SPSS, and Bar Chart been made in Excel.
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Figure 6.10: Nationality and Negative Satisfaction levels through variables of Neighbourhoods amenities and services. Satisfaction means been calculated in SPSS, and Bar Chart been made in Excel
Marital status is the last factor that is significantly related to satisfaction levels of neighbourhood amenities. It related to access to Prophet's Mosque; telephone services; availability of mosques and neighbourhood inner privacy and security. While it is very sensitive for families to see singles or labourers residing in the area, singles have difficulties to find appropriate districts to live in. Also, new married families can not afford adequate dwellings for their size. Most new built apartments or dwellings are for average size households. Such dwellings have between 3-4 bedrooms. Thus, small families also have to find smaller dwellings and they can be afforded only within old districts which are very crowded or informal areas. More details about dwelling units are shown in the next chapter. The rest are very weak factors which are only related to one or two satisfaction levels of neighbourhood amenities. So satisfaction level is mostly related to those factors and levels vary from one variable to another as will be shown below.

6.4 Satisfaction Levels with District's Amenities and Services

As it is shown in questionnaire in appendix, questions of satisfactions are weighted between 1 and 5. Then they are weighted to stress values of either zero for satisfied or one for unsatisfied. This allows recording of such variables using SPSS and calculating percentages of either positive or negative weight. All variables are recorded as new ones and have been given values of zero for either fairly satisfied or very satisfied, and a value of one for either fairly dissatisfied or totally dissatisfied. Those who were neutral were not counted and are considered as missing values. The percentage of negative stress shows deprived issues in a neighbourhood's amenities. On the other hand, positive stress shows good services and amenities afforded by residents. Regarding to frequencies and descriptive analysis, it is clearly shown above in table 6.1 how Al-Madinah neighbourhoods lack nearly all issues related to amenities. Residents are stressed or unsatisfied on twenty three of fifty issues about neighbourhood amenities. Satisfaction is categorized in the following:

6.4.1 Deprived Neighbourhoods

Poverty of neighbourhoods is not only seen in physical amenities, but more in quality of life that improves quality of relationships between neighbours. As shown in figure 6.17 below, the percentage is very high on about half the issues of satisfaction of neighbourhood amenities. Amenities are categorized as follows:
Shaded parking, parking, and walkways

Residents lack shaded parking, parking, and walkways. Firstly, it is because of landlords who are always interested in maximum saleable areas of land and the most profitable land is on streets. Then, provision of parking is left as the responsibility of the owner in the set back from the front. This responsibility might be logical and reasonable for those who own the dwellings they reside in, but while they are tenants the situation totally differs. They do not have the right of holding or acting to change the land for development. The municipality set controls for parking construction, but dwellers have to protect their cars from the heat of the Sun. Figure 6.11 shows residents who have constructed their own garages with simple metal hangers to afford shaded parking. Even if the parking been asphalted, it is not planned or subdivided into parking spaces.

Figure 6.11: Shaded Parking constructed without permission of Municipality, even tree does not afford shading because of wide street, which is dead end one and should be very narrow. Walkway is only about two metres wide, the rest is for car

Nevertheless, when the plot is for multi-storey buildings, the setback area would not be enough for all residents to park within. Consequently, they may park within walkways, or near neighbours’ buildings, and problems are raised between neighbours rather than good relationships if their rights start to be impinged. Thus, multi storey buildings should have bigger areas than plots of villas or houses.
In the majority of approved plans, few have walkways except those which remain as side pavements between streets and land boundaries. It is very clear too in the above picture. It seems that walkways occur only when a designer has by mistake plotted an area to be serviced by road, and then he draws two lines and calls them pathways or walkways. In the picture below it is shown how walkways allow for two cars to park beside doors of villas and there is plenty of space to pass a truck between them. This means that the designer or planner doesn’t care about the measurement of walkways or barriers to prevent cars passing through.

In summing this up Al-Shareef said:

'To buy a plot this requires large amount of money, and so the cost of construction. On the other hand, there are no parks, play ground for children which basic need and very important to provide these services and shopping center for any new plan'. Moreover, there is no sewage system, which is the most important basics of a clean environment, and water should be provided for every unit and no need for tanks' (Al-Shareef 2001)

Figure 12: Pedestrian walkway which very wide to occupy two cars on both sides and space for another two to move between

- Streets, asphalting, and safety

Residents have plenty of streets surrounding their blocks, but they are dissatisfied with street layout, street asphalting and safety. This is because asphalting is only for cars which are tools for mobility but, when they are parked, asphalt is a danger for children in terms of passing traffic, and in term of its nature; it is hard, risky and hot in summer for playing especially in falling accidents. It is surely not the same as natural sandy areas or grassy ones. Streets even sometimes surround parks or play areas, which
change them to danger zones. The figure below shows children playing on a wide street, not because it is good for playing but because it is the only space that they are afforded. But in Figure 6.14, it is shown how playgrounds are privately provided outside urban areas by young people, who straightened the land level and furnishing it with suitable sand at their cost.

Figure 6.13: Playing on street which is the only public space afforded. The picture was taken far from them and when it was sunny and no need for flash. This because if they saw a stranger they will stop playing, especially if they saw the camera

- Play areas, parks, playgrounds, seating areas, clubs, landscaping and vegetation, nurseries, gathering places, open spaces, recreational areas, open spaces

Dissatisfaction here is very high. About 90% of the population is dissatisfied about availability of health and fitness clubs. But this amenity can be addressed as a district one, not at the level of neighbourhoods because those who can go to such facilities are mostly adults, and they can walk or use their own transport. In contrast, play areas and playgrounds and open spaces are commonly for children and seating areas for elderly people. Both groups have difficulty in walking long distances or to ‘drive to such amenities. They either have to play on streets as shown in figure 6.13, or stay inside their homes. Nevertheless, it is very hot during the summer when most activities are occurring. Farms that are eroded, vegetation and landscaping are also dissatisfying for residents. Yet, there are no natural cooler systems for environment of such space for activities. These issues are very important to residents because they are very necessary
for daily life. They are needed the most to facilitate resident’s activities: children’s games and playing; elderly social meeting; recreation for the unemployed; female’s recreation; and disable people. Figure 6.15 shows how local playgrounds have been subdivided for plots and land boundary marks in the play ground, and behind and over the mountain.

Figure 6.14: Playground afforded outside urban areas on vacant land. It was a farm that been neglected to be subdivided later, where urban area is not far. Teenagers go outside urban areas to afford playgrounds, which they do straightening the land level and furnish it with suitable sand on their cost.

Figure 6.15: Local playground been subdivided and been cut to two pieces, despite the slope of land it is used as a playground by children. Land marks are inside the playgrounds even
mountains been marked by plot's marks, of course playground now is a private ownership and will soon developed

Such amenities are spaces for their mobility, recreation, fun, enjoyment, relaxing, peace, and participation. They are the urban components of neighbourhoods. Kammal argues that there are not enough play areas around his and relatives’ dwellings. Though they all share in renting a resort for recreational activities he states:

'I, few brothers, and friends pay annual rent for resort that has a large courtyard to allow children to play a day per each family. Of course there are no public parks around our houses, and streets are so risky for children.'

(Kammal 2002)

Moreover, accessibility to parks too is important for residents as a breathing open space. Those were mostly free to use, until the previous Mayor ‘Omar Qadhi’, was put in charge. Barnawy states that clearly:

'In the past most of parks were free, but now, there are entry charges, where mostly managed by big companies'. (Barnawy 2002)

Parks and open spaces are the activators for relationships of residents to have real and traditional neighbourhoods. When they are missing, all other social values will be missed too even if it takes long time for this to occur. Such amenities should be regarded in new neighbourhood planning. With regard to the size of neighbourhood shown above in chapter five, such amenities should be provided in shared open space. Each amenity should have its own area, facility, type of pavement, protection, security and safety matters as shown at the end of the previous chapter.

Access to mail points

Mail points are also lacked. This may be due to the unfinished project for ‘Street naming and post coding’. Nevertheless, bills for services and payments are now shifting to electronic ones either by email, telephone, Internet, or cash points. Yet, it is not that important for majority of people. In the past mail was arriving door to door, but with vast urban expansion, mail services did not extended their business. Such services should be cared for in provision within the size of the district but not in the neighbourhood unit and stamps should be available at all shops.

Land prices, loan affordability, cost of construction, amount of rent, costs of transportation, electricity, and telephone service

Major dissatisfactions were also noted in these financial issues. About 83% of residents who are tenants, are dissatisfied with land prices in areas they choose to live in no
matter what their reasons for their choice. Percentages in dissatisfaction increase in both loan availability and construction costs. They might have their own plots of land, but they can not afford enough finance to build on them. Even then, the plot they have may be so far from schools, clinics, mosques, works and so on that they live as tenants and are very stressed in their life, and yet plenty of land is still vacant in approved plans. Although some of the approved plans have easy access to services and amenities, but here the landlords are either waiting for land prices to increase for reselling, or don’t have enough resources for their own development. Figure No. 6.7 below shows this clearly. All such amenities together form an environment or neighbourhood unit that creates a good societal unit for neighbours. However, poverty of such amenities will affect its quality and then will affect the formation of social relationships. Therefore intent should be given to such amenities to be afforded at minimum levels.

Attention of efforts to be made for the age groups of those less than 15 years old, the elderly and disabled people. Other groups can afford amenities outside the neighbourhood at the district level. Provision should not be left only to governments but practitioners from the neighbourhoods themselves should form as group, then that organisation should negotiate with the government to participate in the process of decisions for development (Henderson and Thomas 1980).

Figure 6.16: Vacant plot in approved plans of neighbourhoods are used partially by buses free of charge. Services are available for these plots, but landlords are either waiting for increase of prices, or don’t have enough resources for development
Figure 6.17: Glass of negative satisfactions to amenities and services within Al-Madinah districts
In general this dissatisfaction is indicated for amenities which are close to home. It is the open space that in nearby the dwellings, with safe routes from and to, and suitable for playing, seating, and any other activities and gathering. Yet, this might be a demand for neighbourhood court, which is satisfies children and elderly people. In other words, a small size of community on a daily life basis is a neighbourhood.

As shown above the bar chart is in the shape of a glass. The shape is formed by showing both positive (in white), and negative (in black) satisfaction. But it is only for amenities those have negative satisfaction over 50%. This shows high dissatisfaction to issues, amenities and services within Al-Madinah Districts. Local governments, municipality, and related agencies, organisations, bodies, planners, architects, engineers, developers and landlords should care of what in this glass of dissatisfaction. What inside are critical issues of amenities those residents are not happy with its qualities or face shortage in their quantities. Yet, such amenities should be upgraded for better neighbourhoods’ quality for current districts and should be considered in future neighbourhood planning.

6.4.2 Well developed Districts

On the other hand, in general, residents of Al-Madinah are satisfied in term neighbourhoods’ amenities. They value the efforts of the municipality and other governmental organizations and bodies. They indicate their satisfaction levels with low stress. Social morals and faire judgments appear here categorized in their satisfaction levels as follows:

- **Prophet's Mosque and local mosques**

Prayer in Arabic is called ‘Salat’, which means roughly the relationship between God and human kind. The mosque is a place or building where Muslims say prayers five times daily within such a building or space. Meanwhile, it is place of congregation of the community that strengthens social cohesion. One of the most Holy places to Muslims for this religion task is in Al-Madinah city. It is the Prophet Mohammed’s Mosque (PBH). As shown in a previous chapter, the Prophet (PBH) built a mosque as soon as he arrived in Al-Madinah. Fellowship is still most important in Muslim countries. Al-Madinah is one of the cities rich in mosques. The fellowship of his law occurred when he- (PBH) - promised who ever builds a house or ‘Mosque’ for ‘Allah’ or God in life, then he will be rewarded a house in Paradise. Whenever there is a need for a mosque, funding will be available for its constitution. Because of the faith in
Islamic believe that one of the best deeds for God is to build a mosque, wealthy people donate generously for such deeds and so the governments do. Yet, local mosques are in good supply and have good accessibility. Residents of Al-Madinah are fully satisfied in terms of availability and accessibility of either local mosques or the Prophet's Mosque. About 99% of residents are satisfied with the distance to a local mosque. So, neighbourhoods in this amenity are well provided for. It is because prayer is one of the five pillars of Islam. A Muslim must pray five times daily in life. Praying in a mosque is compulsory for every Muslim male adult who can walk to it. Otherwise he can do it at home, riding, sleeping, or prone in cases of sickness. A mosque’s amenity is still well preserved as a cultural issue of Islamic life within the neighbourhood and as said above in the previous chapter a neighbourhood is number of dwellings clustered around a local mosque. Moreover, it is as Al-Hathloul says about the mosque in Saudi Arabian community identity:

'A unique element identified in the case studies is the existence of hierarchy of mosques, which can be used as activity nodes, and landmarks. In fact it has been seen in the case of Yanbo that the hierarchy of mosques can provide a basis for organizing the land use pattern of Muslim's community.'

Allocating the position of mosques in future neighbourhoods necessitates some considerations such as walking distance, good accessibility for local residents by separate walkways and for those who are passing through the street. As shown before in the proposal for treatment of existing subdivisions by allocating a mosque to one end of the open space between plots allows local residents to walk to access it and others outside can enter it from its external entrance. Satisfaction with the distance to the Prophet’s Mosque is lower because of the vast urban expansion of Al-Madinah, which is mainly caused by wasteful measures of plot sizes in planning regulations. Consequently, new developments are far from central zone and Prophet’s Mosque. In questionnaire no 21 it is said that:

'Plans of residential areas should be not far from Prophet’s Mosque and services, utilities and facilities should be afforded' (Al-Hathloul and Mughal 1999: 217)
Proximity to the Prophet’s mosque seems to be one of the residents' main aspirations as stated by (Al-Hathloul and Mughal 1999; Kaki 2000). So, neighbourhood planning in Al-Madinah should consider this issue as a main part of spiritual life of the neighbourhoods as it is the theme of Al-Madinah as known by most pilgrims who visit it.

**Schools**

Neighbourhoods are also well provided with both types of schools. Schools in Saudi Arabia operate a gender separated education system. Here the researcher is talking only about the quantity and location of schools, but not about quantity of classes or number of students. Resident who are satisfied with school availability, accessibility and distance to school range between 77% and 81% of the total as shown below in Figure 6.18. This might be due to most residents being car dependent because of the traffic systems of neighbourhood plans, though it is easy to access schools, especially for girls. It is very common for employees to go out daily from his job to take his children home from governmental schools. Private schools offer transportation for children at extra charge. Planners could do more valuable research and effort to increase the quality of the education system and decrease costs of the governmental expenditure on education in the long term and reduce the need for employees' to leave work for school transport. This can be done using urban information systems in E-Government as shown later in chapter ten.

**Clinics**

Access and distance to clinics are mostly satisfactory. But, satisfaction of residents is lower when asked about availability of clinics. This indicates the quantity of clinics and number of doctors available to patients. Locations of clinics are good, but distributions in multi-storey buildings have shortage of clinics, and though in new districts. People tend to go for the nearest private clinics to avoid full clinic and late service. Moreover, paying for private health care may cause reduction of their savings which might be used for home construction.

**Services**

The majority of residents are satisfied with regard to water, telephone and electricity supplies. However fragmented developments cost the government more in service provision and distribution. It seems this is due to the high rate of development in Al-Madinah as shown before in chapter two. Wireless phones solve the lack of communications. Wireless towers give easy provision of telephone land lines.
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Generally most new districts do not lack telephone services as much as water, sewage, or drainage systems. Yet, Al-Mohammadi argues that

*Moreover, those floods on streets, which we can see them after light rain, they indicated the bad side of planning system. It is wonder if they design beside streets, swage tubes as same as abroad.* (Al-Mohammed 2001)

The water service is also one of the best services in Al-Madinah neighbourhoods and it is free. Limitation of provision occurs only in a very few new approved districts, where residents need to buy water by tanker-trucks to fill their own tanks. Electricity is also an easy service to be afforded in most new districts, because in any new plans out of the urban spectrum it is the duty of landlords to provide infrastructure networks including electricity. Traffic networks in general are in good order, and residents are satisfied in terms of accessibility to schools, Prophet's Mosque, health centers, shopping centers, and work locations. Most tenants choose their dwelling in appropriate locations to work and to schools of their children.

Neighbourhoods are satisfactory in terms of security in general, but safety is as well satisfactory only when children are inside dwellings. Because of dependency on cars, residents are satisfied in terms of accessibility to amenities, street lighting, street width, and rubbish collection. Privacy of neighbourhoods is seen as satisfactory because people mostly do not know how privacy was in the traditional Hoash, mixed with safety and security at the same time. Residents are satisfied regarding to design of shopping centers because they are used as recreational areas, where most have toilets, areas for children' entertainments such as play areas, and trolley-cars etc. Retail and shopping areas are mostly legally allowed on streets with a width of over 30m in planned areas, and 15m in informal areas. However shops are common to find alongside most streets. Two shops which are equal to half the area of a ground floor apartment will benefit the landlord double the amount. So, landlords tend to have shops on the ground floor as a benefit for rent values. Consequently, residents are well satisfied in terms of accessibility and availability of shops. Access to work is low in satisfaction at about 59%. This might be due to the high prices of plots within work areas and wide roads for easy accessibility. People tend to build on land which they can afford according to their financial ability. On the other hand, their satisfaction is lower in terms of distance to work. This is because there are other priorities for choosing a living area such as
schools for children, or wives' work locations. Yet, people who were interviewed said in terms of distance to work as follows:

'I live here in my father's home, and it is so far to work but I have to live here, because of high rent of flats.' (A. S. Al-Logmany 2001)

'Residential unit is fairly small, but because of the distance to hospital where my wife works and safety for here to walk, we live here. I have a villa but it is rented, it is fairly far from here.' (Al-Gelaity 2001)

The bar chart in the figure below shows a bottle that been shaped by both positive satisfaction (in black), and negative one (in white), when positive is more than 50%. It shows their positive satisfaction regarding their districts issues, amenities and services in Al-Madinah. Meanwhile, it should not make stop working but to keep going on effort and to do more for Al-Madinah neighbourhoods and amenities within. Moreover, more efforts will be directed to integrate the optimum and comprehensive form of neighbourhoods as it was in the traditional ones but with modern modifications to fit actual needs and requirements with no wasteful measures but with adjusted ones.

In General, satisfaction levels for neighbourhood amenities and services are strongly related to each other. Thus, in planning, these amenities and services should be regarded as the main focal issues to be afforded in adequate measures and standards. About 44% (25 of 57) of variables' satisfactions are related to more than 30 other satisfactions of neighbourhood and amenities. Table 6.10 shows significances of variables' satisfaction to others using AVOVA tests for both 1% and 5% of significance. It is a summary of 61 tables for which ANOVA tests were undertaken for each single satisfaction variable to others. The results show that they weave together cohesively. In other words, they are associated as each variable satisfaction is associated with satisfactions of other variables as though the whole relations of entire variables seem as weave relationship. Groups of variables are common between services, amenities, and neighbourhood characteristics.
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Positive Satisfaction to Neighbourhood's Amenities

- Distance to Work
- Availability of Public Phones
- Availability of Clinics
- Rubbish Collection
- Street's Width
- Access to work
- Design of Shopping Areas
- Swage Efficiency
- Street's Lightening
- Distance to Shopping centres
- Co-operation of Neighbors
- Distance to Prophet's Mosque
- Enough Shopping Areas
- Access to Shopping Centres
- Distance to Schools
- Availability of Girl's Schools
- Distance to Clinics
- Access to Clinics
- Availability of Boy's Schools
- Inner Privacy
- Access to Schools
- Cost of Water Service
- Neighbouring Ethiems
- Access to Prophet's Mosque
- Availability of Electricity
- Availability of Mosques
- Availability of Telephone service
- Availability of Water Service
- Access to Local Mosque
- Distance to Local mosque

Figure 6.18: Bottle of positive satisfactions to amenities and services within Al-Madinah districts
<table>
<thead>
<tr>
<th>Satisfaction's Variables</th>
<th>Sig. 1%</th>
<th>Sig. 5%</th>
<th>Total Sig.</th>
</tr>
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<tr>
<td>Distance to Prophet's Mosque</td>
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<td>9</td>
<td>23</td>
</tr>
<tr>
<td>Access to Prophet's Mosque</td>
<td>18</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>Distance to Local mosque</td>
<td>3</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Access to Local Mosque</td>
<td>4</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Distance to Recreational Areas</td>
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<td>10</td>
<td>35</td>
</tr>
<tr>
<td>Access to Recreational Areas</td>
<td>26</td>
<td>9</td>
<td>35</td>
</tr>
<tr>
<td>Distance to Clinics</td>
<td>25</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>Access to clinics</td>
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<td>8</td>
<td>36</td>
</tr>
<tr>
<td>Distance to Work</td>
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<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Access to Work</td>
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<td>5</td>
<td>18</td>
</tr>
<tr>
<td>Distance to Schools</td>
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<td>4</td>
<td>25</td>
</tr>
<tr>
<td>Access to Schools</td>
<td>17</td>
<td>6</td>
<td>23</td>
</tr>
<tr>
<td>Distance to Shopping Centers</td>
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<td>31</td>
</tr>
<tr>
<td>Access to Shopping Centers</td>
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<td>Distance to Mail Points</td>
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<td>5</td>
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</tr>
<tr>
<td>Electricity service</td>
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<td>6</td>
<td>17</td>
</tr>
<tr>
<td>Cost of electricity</td>
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<td>Telephone service</td>
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<tr>
<td>Cost of Telephone Calls</td>
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<td>Availability of Public Phones</td>
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<td>Sewage Efficiency</td>
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</tr>
<tr>
<td>Availability of mail points</td>
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<td>Availability of clinics</td>
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<td>Street's lightening</td>
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<td>Rubbish collection</td>
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<td>Availability of mosques</td>
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<td>Availability of Girl's schools</td>
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<td>Availability of Boy's schools</td>
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<td>Availability of Nurseries</td>
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<td>Availability of Open Spaces</td>
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<td>Availability of Sitting Areas</td>
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<td>26</td>
</tr>
<tr>
<td>Availability of Parks</td>
<td>24</td>
<td>7</td>
<td>31</td>
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<tr>
<td>Landscaping and Vegetation</td>
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<td>8</td>
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<td>Availability of Play Areas</td>
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<td>Availability of Playgrounds</td>
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<td>Availability of Pedestrian Walkways</td>
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<tr>
<td>Availability of Health and fitness clubs</td>
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<tr>
<td>Enough shopping areas</td>
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<td>8</td>
<td>29</td>
</tr>
<tr>
<td>Design of shopping areas</td>
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<td>37</td>
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<td>Street's widths</td>
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<td>Street's Layout</td>
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</tr>
<tr>
<td>Road's safety</td>
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<td>7</td>
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<td>Street's asphalting</td>
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<td>Availability of Parking</td>
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<td>Cost of transportation</td>
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<td>Neighbourhood's Ethnicity</td>
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<td>Co-operation of neighbours</td>
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<tr>
<td>Inner privacy</td>
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<td>5</td>
<td>19</td>
</tr>
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<td>Neighbourhood's Safety and Security</td>
<td>16</td>
<td>7</td>
<td>23</td>
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</table>
6.5 Type of Neighbourhoods and Satisfaction Levels

Sections above have already shown in general different levels satisfaction in all districts of Al-Madinah, but when classifying districts to either planned or informal the results are slightly different. While few people live in the district of The Housing Project and traditional areas; the majority live either in planned and informal areas. Those who live in planned areas outnumber those in informal areas by one tenth of the total questionnaires. The housing project is very small compared to the total number of households in Al-Madinah. Moreover, traditional areas were almost demolished and only a few areas around the Prophet’s Mosque still exist, but in a very bad condition. Resident’s satisfaction levels vary between these neighbourhoods. As there are fewer traditional areas in comparison to planned and informal areas, they will not be used for the purposes of this discussion. On the other hand, housing project residents are shown in discussions because their views will be used for the evaluation of contemporary neighbourhood planning for the comprehensive development of The Housing Project.

![Bar chart showing the distribution of respondents across different types of neighbourhoods](image)

Figure 6.19: Types of neighbourhoods and numbers of respondents in each type

6.5.1 Planned districts and satisfaction with amenities and services

In reference to table 6.11 below, residents in planned areas are satisfied with the following issues: distance to work; Prophet’s Mosque; shopping centres; school’s mosques; health centres; and to local mosques; accessibility to work; health centres; shopping centres; schools; the local mosque; and to the Prophet’s Mosque; availability of public phones; clinics; girls' schools; and boys' schools.
Table 6.11: Planned neighbourhoods and satisfaction with amenities and services

<table>
<thead>
<tr>
<th>Neighbourhood Issue</th>
<th>Satisfied %</th>
<th>Neighbourhood's Issue</th>
<th>Satisfied %</th>
</tr>
</thead>
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<tr>
<td>Availability of shaded parking</td>
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<td>Transportation cost</td>
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<tr>
<td>Availability of clubs</td>
<td>8.9</td>
<td>Distance to work</td>
<td>55</td>
</tr>
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<td>Availability of loans</td>
<td>13</td>
<td>Availability of public phones</td>
<td>56.5</td>
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<td>Interest rates</td>
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<td>Street layout</td>
<td>61.1</td>
</tr>
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<td>Building costs</td>
<td>14.5</td>
<td>Availability of clinics</td>
<td>62.7</td>
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<td>Availability of walkways</td>
<td>15</td>
<td>Street cleaning</td>
<td>62.9</td>
</tr>
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<td>Bank Loans</td>
<td>17.9</td>
<td>Easy access to work location</td>
<td>63</td>
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<td>Efficiency of sewage</td>
<td>66.4</td>
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<td>Loan terms and conditions</td>
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<td>Distance to Prophet's Mosque</td>
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<td>Availability of playgrounds</td>
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<td>Street lighting</td>
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<td>Amount of rent</td>
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<td>Availability of sitting areas</td>
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<td>Access to Health centres</td>
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<tr>
<td>Availability of nurseries</td>
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<td>Availability of boys' schools</td>
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</tr>
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<td>Furniture cost</td>
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<td>Services costs</td>
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<td>Distance to recreational areas</td>
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<td>Gathering places</td>
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<td>Easy access to local Mosque</td>
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<tr>
<td>Access to recreational areas</td>
<td>44.7</td>
<td>Distance to local Mosque</td>
<td>100</td>
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</table>

The highest satisfaction level is for local mosques which are very important for daily life in Al-Madinah society. This means that education, health, Mosques and Awqaaf, and municipal sectors are making good efforts to meet the high demand of their services. Residents of planned areas are also satisfied with street cleaning; design of shopping centres; quantity of shopping centres; efficiency of sewage location; street width; street lighting; street layout; clean water service; telephone service; electricity service; and quantity of mosques. However this does not mean that expenditure of such service provision is optimum. Residents are dissatisfied with the cost of services, especially transportation, electricity and telephone.
Chapter Six: Contemporary neighbourhoods and satisfaction levels

When residents of planned areas enjoy co-operation between their neighbours despite different ethnicities, and enjoy peace, privacy, security and safety, it is due to the Islamic values they hold. Yet, land subdivision does not encourage more social interaction between neighbours and a better environment for all age groups and genders. Because of that residents are dissatisfied with the availability of the following in their planned districts: shaded parking; clubs; walkways; play areas; playgrounds; parks; sitting areas; parking; nurseries; open spaces; and meeting places. These amenities should have been considered within planned and subdivided land before they were developed. However, these amenities are missing in contemporary neighbourhoods. This is might due to services provision and distribution in planning -such distance to recreational areas which are provided for publics of all Al-Madinah but not at level of neighbourhoods- are missed. Nonetheless, money and related issues, such as the cost of living, are also areas of dissatisfaction by residents of planned areas in Al-Madinah.

6.5.2 Informal districts and satisfaction with amenities and services

As with planned areas, and can be seen on the left hand side of table 6.12 below, informal areas lack: shaded parking; parks; parking; play areas; playgrounds; clubs; sitting areas; meeting places; open spaces; landscaping and vegetation; nurseries; mail points; recreational areas; road asphalting; and wide streets. However dissatisfaction with narrow roads is lower than in planned areas, which means that wide roads are wasteful. Moreover, satisfaction is lower than half with street layout, which means that informal patterns of roads are not preferable or efficient for traffic flow. Dissatisfaction with finance issues and related policies is higher than in planned areas, which means there are poor economic conditions for the residents in informal areas.

People are satisfied with basic amenities but in general satisfaction levels are still lower than in planned areas except in quantity of mosques; distance to Prophet’s Mosque and roads width. Informal areas should be upgraded in terms of providing more open spaces for recreational activities; parking; safe walkways; setting areas; landscaping; vegetation; street layout; and design of shopping centers. Then such districts can be considered to be neighbourhoods to live in. Education and the private sector should consider a provision of nurseries within informal areas for free, or with affordable prices, to increase the education of residents from an early age, and this will increase their awareness of how their participation has an effect on neighbourhood upgrading with the co-operation of municipalities.
### Table 6.12: Informal districts and satisfaction with amenities and services

<table>
<thead>
<tr>
<th>Neighbourhood Issue</th>
<th>Satisfied %</th>
<th>Neighbourhood Issue</th>
<th>Satisfied %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of shaded parking</td>
<td>1</td>
<td>Availability of clinics</td>
<td>52.6</td>
</tr>
<tr>
<td>Availability of parks</td>
<td>6.4</td>
<td>Street cleaning</td>
<td>53.3</td>
</tr>
<tr>
<td>Availability of parking</td>
<td>6.9</td>
<td>Gathering events</td>
<td>54.3</td>
</tr>
<tr>
<td>Availability of play areas</td>
<td>9.3</td>
<td>Access to work location</td>
<td>56.5</td>
</tr>
<tr>
<td>Availability of clubs</td>
<td>10.8</td>
<td>Availability of public phones</td>
<td>57</td>
</tr>
<tr>
<td>Availability of walkways</td>
<td>11.8</td>
<td>Distance to work</td>
<td>57.3</td>
</tr>
<tr>
<td>Availability of playgrounds</td>
<td>12.2</td>
<td>Design of shopping centres</td>
<td>58.3</td>
</tr>
<tr>
<td>Availability of setting areas</td>
<td>13.2</td>
<td>Street lighting</td>
<td>63.4</td>
</tr>
<tr>
<td>Landscaping and vegetation</td>
<td>21.1</td>
<td>Efficiency of sewage</td>
<td>65.3</td>
</tr>
<tr>
<td>Availability of open spaces</td>
<td>25.3</td>
<td>Distance to shopping centres</td>
<td>67.7</td>
</tr>
<tr>
<td>Distance to recreational areas</td>
<td>25.8</td>
<td>Access to shopping centres</td>
<td>70.4</td>
</tr>
<tr>
<td>Road asphalting</td>
<td>27.1</td>
<td>Distance to schools</td>
<td>73</td>
</tr>
<tr>
<td>Services costs</td>
<td>27.2</td>
<td>Enough shopping centres</td>
<td>74.2</td>
</tr>
<tr>
<td>Gathering places</td>
<td>28</td>
<td>Co-operation of neighbours</td>
<td>74.7</td>
</tr>
<tr>
<td>Cost of electricity</td>
<td>30.2</td>
<td>Distance to health centres</td>
<td>77</td>
</tr>
<tr>
<td>Street layout</td>
<td>31</td>
<td>Easy access to schools</td>
<td>77.1</td>
</tr>
<tr>
<td>Amount of rent</td>
<td>31.5</td>
<td>Distance to Prophet's Mosque</td>
<td>78.3</td>
</tr>
<tr>
<td>Cost of telephone service</td>
<td>35.4</td>
<td>Availability of boys' schools</td>
<td>79.5</td>
</tr>
<tr>
<td>Road safety</td>
<td>35.7</td>
<td>Access to health centres</td>
<td>79.6</td>
</tr>
<tr>
<td>Access to recreational areas</td>
<td>37.4</td>
<td>Availability of girls' schools</td>
<td>80.7</td>
</tr>
<tr>
<td>Furniture cost</td>
<td>37.5</td>
<td>Neighbourhoods' privacy</td>
<td>81.2</td>
</tr>
<tr>
<td>Enough mail points</td>
<td>38.8</td>
<td>Access to Prophet's Mosque</td>
<td>83.3</td>
</tr>
<tr>
<td>Distance to Post Office</td>
<td>40.2</td>
<td>Neighbourhood ethnicity</td>
<td>83.3</td>
</tr>
<tr>
<td>Street width</td>
<td>41.9</td>
<td>Cost of water</td>
<td>86.3</td>
</tr>
<tr>
<td>Transportation cost</td>
<td>46.8</td>
<td>Electricity service</td>
<td>87.3</td>
</tr>
<tr>
<td>Availability of loans</td>
<td>10</td>
<td>N'hood safety and security</td>
<td>88.2</td>
</tr>
<tr>
<td>Building costs</td>
<td>11.9</td>
<td>Water service</td>
<td>90.5</td>
</tr>
<tr>
<td>Bank Loans</td>
<td>12.7</td>
<td>Telephone service</td>
<td>91.7</td>
</tr>
<tr>
<td>Land prices</td>
<td>12.8</td>
<td>Enough Mosques</td>
<td>94.3</td>
</tr>
<tr>
<td>Loan terms and conditions</td>
<td>12.9</td>
<td>Distance to local Mosque</td>
<td>98.1</td>
</tr>
<tr>
<td>Interest rates</td>
<td>13.1</td>
<td>Easy access to local Mosque</td>
<td>98.1</td>
</tr>
<tr>
<td>First payment</td>
<td>16.4</td>
<td>Loan periods</td>
<td>22.8</td>
</tr>
</tbody>
</table>

Despite of that some ethnicities are the majorities who live in such informal areas as shown in chapter three, satisfaction to these issues are very high. This is might dues to the Islamic principles of neighbouring those been rooted inside people whatever ethnicity they have. This means that most people who live in Al-Madinah abide by Islamic principles.

#### 6.5.3 Satisfaction with amenities and services in the Housing Project

As a district The Housing Project is considered the best amongst neighbourhood types in Al-Madinah. It has had the involvement of skilled planners and architects in Al-Madinah, who participated with the contractors and consultants who implemented
the whole project. Satisfaction level data in terms of amenities and service should be shown is descending order as below. Table 6.13 below shows that residents in The Housing Project are satisfied with percentages of between 100% and 80% for the main basic amenities and services which both other informal and planned districts lack. People in The Housing Project are satisfied in terms of local mosques even when quantity is not enough. Residents are satisfied with infrastructure networks but not the costs of services. They are dissatisfied with costs more than in planned and informal areas.

Table 6.13: Residents in Housing Project and their satisfaction with amenities and services

<table>
<thead>
<tr>
<th>Neighbourhood Issue</th>
<th>Satisfied %</th>
<th>Neighbourhood Issue</th>
<th>Satisfied %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of nurseries</td>
<td>100</td>
<td>Street width</td>
<td>60</td>
</tr>
<tr>
<td>Distance to local Mosque</td>
<td>100</td>
<td>Distance to work</td>
<td>57.1</td>
</tr>
<tr>
<td>Easy access to local Mosque</td>
<td>100</td>
<td>Easy access to schools</td>
<td>57.1</td>
</tr>
<tr>
<td>Enough shopping centres</td>
<td>100</td>
<td>Availability of shaded parking</td>
<td>50</td>
</tr>
<tr>
<td>Neighbourhood ethnicity</td>
<td>100</td>
<td>Distance to health centres</td>
<td>50</td>
</tr>
<tr>
<td>Street layout</td>
<td>100</td>
<td>Enough Mosques</td>
<td>50</td>
</tr>
<tr>
<td>Street lighting</td>
<td>100</td>
<td>N'hood safety and security</td>
<td>50</td>
</tr>
<tr>
<td>Telephone service</td>
<td>100</td>
<td>Road asphalting</td>
<td>50</td>
</tr>
<tr>
<td>Water service</td>
<td>100</td>
<td>Road safety</td>
<td>50</td>
</tr>
<tr>
<td>Efficiency of sewage</td>
<td>87.5</td>
<td>Street cleaning</td>
<td>50</td>
</tr>
<tr>
<td>Availability of parking</td>
<td>85.7</td>
<td>Availability of clubs</td>
<td>40</td>
</tr>
<tr>
<td>Distance to shopping centres</td>
<td>85.7</td>
<td>Distance to Prophet's Mosque</td>
<td>40</td>
</tr>
<tr>
<td>Access to Prophet's Mosque</td>
<td>85.7</td>
<td>Building costs</td>
<td>37.5</td>
</tr>
<tr>
<td>Electricity service</td>
<td>85.7</td>
<td>Land prices</td>
<td>37.5</td>
</tr>
<tr>
<td>Distance to schools</td>
<td>83.3</td>
<td>Access to health centres</td>
<td>42.9</td>
</tr>
<tr>
<td>Availability of walkways</td>
<td>80</td>
<td>Easy access to work location</td>
<td>33.3</td>
</tr>
<tr>
<td>Availability of parks</td>
<td>75</td>
<td>Cost of electricity</td>
<td>28.6</td>
</tr>
<tr>
<td>Availability of playgrounds</td>
<td>75</td>
<td>Amount of rent</td>
<td>25</td>
</tr>
<tr>
<td>Availability of boys' schools</td>
<td>71.4</td>
<td>Gathering places</td>
<td>25</td>
</tr>
<tr>
<td>Availability of play areas</td>
<td>71.4</td>
<td>Design of shopping centres</td>
<td>20</td>
</tr>
<tr>
<td>Cost of water</td>
<td>71.4</td>
<td>Enough mail points</td>
<td>20</td>
</tr>
<tr>
<td>Access to shopping centres</td>
<td>71.4</td>
<td>Gathering events</td>
<td>20</td>
</tr>
<tr>
<td>Landscaping and vegetation</td>
<td>71.4</td>
<td>Services costs</td>
<td>16.7</td>
</tr>
<tr>
<td>Availability of clinics</td>
<td>66.7</td>
<td>Transportation cost</td>
<td>16.7</td>
</tr>
<tr>
<td>Availability of setting areas</td>
<td>66.7</td>
<td>Distance to Post Office</td>
<td>14.3</td>
</tr>
<tr>
<td>Cost of telephone service</td>
<td>66.7</td>
<td>Furniture cost</td>
<td>14.3</td>
</tr>
<tr>
<td>Distance to recreational areas</td>
<td>66.7</td>
<td>First payment</td>
<td>100</td>
</tr>
<tr>
<td>Access to recreational areas</td>
<td>66.7</td>
<td>Monthly payback payments</td>
<td>100</td>
</tr>
<tr>
<td>Availability of girls' schools</td>
<td>62.5</td>
<td>Interest rates</td>
<td>50</td>
</tr>
<tr>
<td>Neighbourhoods' inner privacy</td>
<td>62.5</td>
<td>Loan periods</td>
<td>50</td>
</tr>
<tr>
<td>Availability of open spaces</td>
<td>60</td>
<td>Loan terms and conditions</td>
<td>50</td>
</tr>
<tr>
<td>Availability of public phones</td>
<td>60</td>
<td>Bank loans</td>
<td>33.3</td>
</tr>
<tr>
<td>Co-operation of neighbours</td>
<td>60</td>
<td>Availability of loans</td>
<td>33.3</td>
</tr>
</tbody>
</table>
The district seems an optimum place to reside in but it is still not considered a
neighbourhood. Open spaces; play areas; playgrounds; parking; walkways; landscaping
and vegetation are all areas where residents are satisfied. Gathering places and events
are lacking, and people are neither satisfied nor dissatisfied with neighbourhood safety
and security (50%). However, people in The Housing Project are less satisfied with the
level of co-operation between neighbours than in informal and planned areas.
Moreover, people who were granted these villas in The Housing Project were allocated
by the order of loans applications in REDF, they did not choose their location or their
neighbours, and consequently relationships between neighbours are not very strong,
even if all amenities are provided within the neighbourhood. Nonetheless, the design of
the neighbourhood and street layout has been met with satisfaction (100%) in terms
pavement, asphalting and lighting. But these amenities and services do not form
gathering spaces for local residents to sit, talk, know, and trust each other, and then co-
operate in their daily life. The Housing Project still lacks clubs, meeting spaces, and
good design of shopping centres. The planner and urban designer should consider that a
neighbourhood needs its own centre that allows local people to gather together for
occasions and events. Moreover, people are not satisfied with street cleaning and the
municipality should give more attention to the continuous maintenance of roads, parks,
open spaces, play areas, playgrounds, and landscaping; otherwise districts will be the
same as informal areas.

6.6 Conclusion

In general for all residents interviewed, high satisfactions levels are shown with the
following issues: distance and access to local mosque, water service, electricity service,
television service and safety and security within the neighbourhood. Satisfaction mean
value is over 4. High satisfaction level of infrastructure networks and services does not
mean that all new plans are serviced because respondents are living in serviced plans
only. Medium satisfaction is found for the following issues: noise & smell pollution,
distance and access to Prophet's Mosque, to work, schools, to shopping centres and to
clinics, water cost, sewage efficiency, public phones, street lighting and cleaning,
availability of girls and boys schools, shopping areas availability and design, street
width, neighbours racial ethnicity and neighbourhood co-operation and inner privacy.
The lowest satisfaction level is in terms of the following: access to recreational areas, to
post offices and availability of mail points, costs of electricity and telephone calls,
availability of open areas, street layout and asphalting, road safety, services costs, transportation costs, furniture costs and halls for gathering in events other than mosques.

On the other hand, dissatisfaction levels are found for the following: availability of play grounds and recreational areas, seating areas, parks, parking, landscaping and vegetation, and availability of play areas and nurseries. Even more negative satisfaction levels were found for the following issues: shaded parking, walkways and club availability.

In general, satisfaction was affected when associated with dwelling ownership. In most variables above, satisfaction is less than dissatisfaction especially in owners and private tenants. Residents renting from public projects and employers rented are more satisfied than dissatisfied. But such types of dwellings are very limited in Al-Madinah. Thus, the general trend here to dissatisfaction is high. The main findings are as follows:

- Dwelling ownership is associated with factors of total monthly income
- It is also associated with satisfaction with distance and availability of mail points. Mail points are lacking in most Al-Madinah districts
- It is associated with satisfaction with distance and accessibility to recreational areas. They are also lacking in most areas except traditional areas which are very limited
- It is associated with satisfaction with availability of clinics. There are not enough clinics in new districts
- Dwelling ownership is associated with satisfaction with street width and asphalting. Streets seem fairly satisfied but in new districts plans roads are more than 12 m wide and consequently they are very risky for children who will find asphaltered roads as straight lands for playing while drivers especially learners find roads a loop to try some dangerous chasing.

Thus, the transformation process affects activities such as playing and seating and recreational and shaded walkways as found in traditional neighbourhoods or ‘Ahwash’. The open space or courtyard that gathers all neighbours together. Nevertheless, satisfaction with street layout and asphalting is at a very low level. Some neighbourhood plans include some areas for play grounds or district’s parks, but they were privatised, and entry is not free for the public. Vacant lands may be used as
playgrounds but also may be walled for securing ownership from any future proposals as play grounds.

Street areas waste areas which have been saved from walkways and other areas. This is again for saving areas as saleable lots. Areas are also wasted by building regulations such as set back, and street width as shown in the next chapter. The loser is the private landlord who will lose 40% in set back from all sides when building a plot for worthless narrow walk ways around the building. The public loser is the municipality who will asphalt more areas for wide streets and very low use. Government and infrastructure agencies are losers in terms of expenditure of more infrastructures networking for new plans with wasteful measures and as Al-Fozan (1994) say:

'\textit{Fat is not only in our bodies, but also extended to our villages and cities, this extension is not only includes areas those need service provision, but also increase funds for networks maintenance especially in such our desert nature of land}.'

Meanwhile, most neighbourhoods are fragmented in term of plots, developments, some amenities and consequently communities. New urban neighbourhood planning should work to pull these fragments of urban plots within open space and so gather the splintering society into a local urban form of neighbourhood which is a part of Al-Madinah's local identity. Neighbourhoods then will be integrated by people as voluntaries between neighbours and then upgrading the amenities those they needs. Moreover, vacant lands within the holy area are the best and have priority for developments with satisfied measures of building regulations those enable people to build new their dwellings within holy zone, or to own 'buy' the dwellings those they reside as tenants. Further more, financial policies should be enhancing process of developments within the holy zone to integrate neighbourhoods and fill up the fragmented vacant lands with liveable neighbourhoods. Duties here are mostly on planners to how these neighbourhoods should be planned and integrated around open space.

But before skipping to propose any concepts of how modern planners can deal with and treat such new urban neighbourhoods or 'Ahwash', it is essential to analyse the dwelling units quantity and quality that fit within such a neighbourhoods in the next two chapters.
Chapter Seven: the Unit, Quality of Dwelling Unit and Space Syntax

(Using SPSS analysis of contemporary qualities, and Gamma diagrams)

"The paradox of our time in history is that we have taller buildings, but shorter tempers;... We have bigger houses and smaller families; these are days of two incomes, but more divorce; of fancier houses, but broken homes." Dr. Bob Moorehead
7.1 Introduction

The previous two chapters outline building regulations within each planned area and the satisfaction levels of residents regarding issues, amenities and services in Al-Madinah districts. For neighbourhood planning, planners should not only understand measures for such amenities, services and resident's satisfaction, but they should also know how to adjust measurements for the basic unit within the neighbourhood. This unit is the dwelling unit, or 'housing unit', in all its forms or types.

This chapter shows more detailed information for residential units within Al-Madinah, according to their measurements, and is related to social references of Al-Madinah’s households. It shows how Municipal measures are the most influential in how people think in terms of building their own house, and why they cannot. Moreover, it shows how wasteful measures are applied in Al-Madinah houses and how this might occur in other Saudi cities, due to the central planning system. These measures enable only the richer classes to build their own dwellings, and they are able to build more as investments, while the middle and poor classes still live as tenants or in housing and neighbourhoods that suffer from poor conditions. Most of these low income groups are renting properties in regard to their requirements and socio-economic characteristics, but rather they tend to show their wealth or class. Yet, middle income groups tend to rent dwellings those have top quality and so that rent seems very high to them. In general, resident's customs and planning authorities' regulations led to this increase in housing measures, the high costs of building and infrastructure networking. The resulting residential unit or dwelling is oversized and of inappropriate quality.

The new homes which have been built around the original city do not seem conducive to the sustainability of Al-Madinah's built environment, either in terms of quality or cost. On the other hand, small plots in informal areas are considered slum areas and are socially unacceptable for the younger generations, or are very expensive in terms of their location and distance to The Prophet's Holy Mosque and other amenities. In this chapter, the quality of the residential unit will be investigated. Traditional houses in Al-Madinah had a unique urban form. Houses were called 'Boyuit', or 'Bait' for a single house, in Arabic and the local dialect. Its meaning includes 'peaceful space for living, a private dwelling for domestic activities, and the actual building for the family's social life'. But before allocating the size of dwelling it may be useful to explore the dwellings' quality.
The term 'quality' here includes types of dwelling units. Quality also includes traditional housing in Al-Madinah and a comparison of past and current designs of spaces using space syntax to draw up special sentences as each space a word in sentence's order of contemporary and traditional dwelling in Al-Madinah. The following sub-chapters show the different types and sizes of dwelling in Al-Madinah and an analysis of sizes and satisfaction levels of residents in terms of each part of their residential units.

7.2 The dwelling unit

A dwelling unit consists of related spaces for the dynamics of human life and relationships within an exact location and specific time. Thus, dwellings differ from one country to another and sometimes from one city to another. However, global power and a smaller world through improved communications has affected the development of dwellings and, in most places, they have become similar, especially within one country. It is necessary to understand how dwelling units in Al-Madinah should be defined and how traditions, culture, and socio-economic characteristics require a change in current polices and regulations that control types and sizes of dwellings through building regulations within the neighbourhood planning process and procedures.

7.2.1 Definitions

"Man regressing to the cave dwelling, but in alienated, malignant form. The savage in his cave (a natural element which is freely offered for his use and protection) does not feel himself a stranger; on the contrary he feels as much at home as a fish in water."

{Ward, 1990: 102}

A dwelling unit is only for tenure or ownership because dwelling means a place of permanent residence. In the Brainy dictionary it is defined as habitation; place or house in which a person lives; abode; or domicile. When each word which followed was defined separately all led to one meaning of permanent resident place or house (Brainy Media, 2001). It is not defined as a palace or a large piece of land for a dwelling. Nor should it necessarily have all the amenities that wealthy people have in their villas. In Arabic the word for dwelling is ‘Sakan’. It means a calm place that is also full of social life, and where a household lives. It also means a place where a person can repose quietly in serenity, comfort, and peace. Islamic law and the fellowship of the Prophet’s
guidance affect houses in Al-Madinah. The Prophet (Peace to be Upon Him) instructed Muslims saying: ‘Pray in your houses and don’t make them as cemeteries’ {Al-Albani, 2005}. Houses or dwellings seem to be the best place to pray, except for the five prayers that should be carried out in mosques {Al-Albani, 2005). Houses in Al-Madinah are considered a holy place for the soul and private life. They are unique from other houses in the Middle East, their quality is remarkable in Saudi Arabia and Middle Eastern cities.

Burckhardt describes such houses saying:

*Medina is well built, entirely of stone; its houses are generally two stories high, with flat roofs. As they are not white-washed, and the stone is of dark colour, the streets have rather a gloomy aspect; and are, for the most part, very narrow, often only two or three spaces across: a few of the principal streets are paved with large blocks of stone; a comfort which a traveller little expects to find in Arabia. It is, on the whole, one of the best-built towns I have seen in the East, ranking in this respect next to Aleppo.* (King, 1998)

However, Burckhardt describes how these quality houses start to deteriorate, lose their splendour, and are overlooked by new developments. He found a few large private houses with small gardens and wells for irrigation. This means that most houses were small and with no courtyards as stated before in Chapter Five, but to understand the nature, quality and meaning of a traditional house in Al-Madinah more detail is required, and this is explored below.

Households in Al-Madinah are comprised of either native citizens, from Saudi Arabia, or temporary residents who have settled in Saudi Arabia either for work, or because of their belief that Al-Madinah has holy status within the Islamic World. When the researcher was a child (1975) some areas of Al-Madinah -as he still remembers- had wooden lodges, which were very strange in Al-Madinah. Models of these dwellings were imported from Africa and Asian countries. Many immigrants came to the Hajj and remained in Al-Madinah as their last destination. Such models could not be sustained because of the deep-rooted traditional architecture that dominated at that time, and later, new building regulations in general throughout Saudi defeated such strange models but did not preserve traditional ones. Generally the new designs were western models by famous architects and planners at that time. Bahammam narrated from Al-Hathloul 1981 that in the 1950s:
The contemporary villa type dwelling is built as a final product of new design concept that was adopted through municipal rules and regulations (Bahammam, 1998: 12)

Such models started in ArRiyadh, as Bahammam states, with 754 villas, and since then the villa has become the most dominant model of dwelling with hundreds of thousands built in Saudi Arabia. It became the only type of dwelling available as a custom model (Bahammam, 1998). The adoption of this model, and the practice of repeating it all over the country with no concern for the local identity of each region or city, especially in Al-Madinah, was a mistake for which planners and architects in Al-Madinah were condemned by Yousef (2005). The transformation that occurred in materials affected both styles and sizes and then transformed values, ethics, and social behaviours. Home-seekers however, especially those with limited incomes, are looking to live in affordable dwellings and homes, which, in accordance with municipality building regulations, are either villas, or apartments either in two storeys, or multiple storey buildings.

These regulations and REDF loans enhanced vast urban development with only two models—villa or apartments. Nevertheless such regulations are in opposition to the Bedouin’s traditional house style, which spread over surrounding towns and villages to Madinah as the regional centre. This is the single-storey courtyard house built only from bricks, cement, and wood for the roofs. This type of dwelling is widely used in informal areas, as shown before in chapter two. However, after neighbours developed their own plots with two or more storeys, these houses were left with no privacy to their inner courtyards. Instead, they tended to be converted to contemporary types of dwelling, either villas or apartments. The majority of courtyard houses have informal tenure, which means dwellers cannot build or develop them unless they are legitimised with legal deeds, and the process of legalisation can take two years or more. Yet, owners ignore the development of these areas and tend to develop in remote and new plots, which in some areas are not serviced with water and sewage. Others remain as tenants of apartment dwellings in well serviced areas near mosques, schools, nurseries, and clinics even though they lack parks, playgrounds, play areas, parking, and seating areas as shown before in chapter six. Such dwellings seem temporary until they obtain the finances to develop their plots, or until the district is totally serviced with basic amenities. Thus the various types of contemporary dwellings should be discussed with

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1 One of the earliest Architects in Al-Madinah, and been interview on Saudi Arabian TV channel 1
regard to the data collected from questionnaires, before exploring policies of developmental funding.

Table 7.1: Types of Residential Units

<table>
<thead>
<tr>
<th>Dwelling Type</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apartment in multi storey building</td>
<td>185</td>
<td>69.3</td>
</tr>
<tr>
<td>Traditional house</td>
<td>25</td>
<td>9.4</td>
</tr>
<tr>
<td>Villa</td>
<td>57</td>
<td>21.3</td>
</tr>
<tr>
<td>Total</td>
<td>267</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 7.2: Type of Residential Unit within Plot

<table>
<thead>
<tr>
<th>Types of use in permits</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apartments</td>
<td>32</td>
<td>64.0</td>
</tr>
<tr>
<td>Link House</td>
<td>1</td>
<td>2.0</td>
</tr>
<tr>
<td>Villa</td>
<td>9</td>
<td>18.0</td>
</tr>
<tr>
<td>Semi-Detached</td>
<td>1</td>
<td>2.0</td>
</tr>
<tr>
<td>Holiday house</td>
<td>6</td>
<td>12.0</td>
</tr>
<tr>
<td>Fence</td>
<td>1</td>
<td>2.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Samples of permits from Municipality’s archives

In general, Al-Madinah's dwellings consist of three types: apartments, villas and local vernacular houses. They differ in terms of their qualities and percentages within urban areas. Table 7.1 shows the type of current contemporary dwellings in Al-Madinah (2001). Table 7.2 shows percentages of types of uses of residential plots using the data from the Department of Building Permission at Al-Madinah Municipality (2001).

Both tables demonstrate the major type of dwelling is the apartment, which has over 64%. Villas account for about 20%, and the remainder are either traditional or local Bedouin houses. New forms of semi-detached villas have appeared recently, but only in large development projects by real estate development companies. In this form, plots may be used for more than one villa. A few developers also offer a very small attached link houses. Legally it is very difficult to separate ownership deeds of these types of properties in single plots for two or more for the public. However this was allowed recently for big firms, as mentioned above. Both types are single dwelling per building; they seem traditional in regard to the small area and a single household per residence. However the finishing is decided by each developer and different in each case. In some
cases very limited choices are left for the new owners. Nevertheless, developers are targeting high to mid income groups, which are small markets as shown in the previous chapter. Each type of dwelling is explored with relevance to its urban characteristics and dwellers socio-economic characteristics, as shown below, to show the quality of each type to social and economic characteristics which suit or adequately fit such type of dwellings. Most data comes from questionnaires, interviews, and the author's experience.

7.3 Islamic principals and design of dwellings

Islamic architecture been strongly characterised by diversity as stated by Hoag (1975). The constant factor is the core that includes functional, social, and human requirements which in Islam is controlled by law and includes both beliefs and functions as stated by Koshak (1995). But Koshak stated that the shape is changeable with regard to local identity.

7.3.1 Privacy and entry

It has been mentioned in the Quran that people should not talk directly to the prophet’s wives unless hearing from behind a barrier or a screen that preserves the purity between genders, and Muslims should follow every principal of the Prophet (PBH). However this example refers only to unknown men from outside the family. This leads to the principal of privacy for women from the outside spaces and none ‘Mahram’ men. Within private section, women are allowed to dress whatever they like and put the scarf off. This provides more relaxation in dressing informally and conditioned to cover over kneed up to tummy. On the other hand, those men who are not ‘Mahram’s should avoid entering other’s houses or invading their privacy. Behaviour is controlled in Islam as mentioned in Surat An-Noor verse 27-29. But relatives, such as brothers of wives, uncles, nieces, and grand children, are allowed to go through to the private section as guests as mentioned in Surat Al-Ahzaab 33 verse 53 and in Surat An-Noor verse 61. It is also not permitted even for young children and domestic workers for entry is also banded between night time and afternoon when couples may have their own time of rest and love which provide more privacy for household heads as noted in Verse 58 (Al-Islam.com, 2005).

21 Mahram’ is an adult male who is relative to a female and they are not allowed to get married such as father, brother, uncle, nephews, or brothers those been shared with here same breast feed at infant age.
7.3.2 Generosity for guests
Generosity to guests is ordered by Islam and maximum period guest can stay is the host's house is for three days as ordered by Prophet (PBH), yet it is expected that household should provides as much space for guests in the dwelling as possible. This can be seen very clearly in house designs as most guest rooms are separated in Al-Madinah Traditional houses for this reason. This principal conflict with the privacy's one, however conflicts had been sorted in contemporary designs by segregation guest section form private ones with circulation spaces. This will lead to wasteful spaces in segregation and circulation spaces only if architects are not professional ones.

7.3.3 Segregation between genders
Islam controls behaviour in a child's early and teenage years. Muslims are ordered by the Prophet (PBH) to segregate genders after ten years. Therefore, more rooms are needed when two genders of children of this age exist in the household. This lead that master room has its own toilet deeper and segregated from children one. Moreover, more circulation spaces segregate children's spaces from parents' ones. Nonetheless, domestic worker who is mostly unrelated to the adult male in house is kept near kitchen to segregate her bedroom from the household males' spaces within dwelling, and to provide her more privacy at same time.

7.3.4 Wide house without wasteful consumption
Islam recommends people not to be wasteful, in all areas of life such as money, wide enough buildings but avoiding high ceilings, and in consuming water and food. Yet, adjustment the area of spaces to avoid wasting of money is an essential principal in Islam. But, to satisfy privacy and segregation between genders this requires two segregated sections for guests, and another private one. Moreover, harsh weather, and high cost of lands lead designers from construction two separate dwellings, to segregate genders' spaces by circulations for skirting around. Again, designers stuck in a wasteful consumption of space and especially those who are not professionals and convinced with western models of villa.

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3 (Al-Islam.com, 2005) Hadith, Abo Dawood Sunan No: 418
5 (Koshak, 1995) p: 14
6 (Al-Islam.com, 2005) Quran, Al-A'araf 7, Verse 31-32
7.3 5 Neighbour's rights
Prophet (PBH) recommends that people should be kind to their neighbours and that they should not harm them. Furthermore, that they allow them to insert beams for the construction of their houses and use their wall as support. These supports previous principal in reducing costs of construction between two neighbours and also increase structural consolidation for any attached houses. Consequently traditional architecture had the form the attached houses. Even more in some case there was neighbours who built a floor over the roof area of next door neighbours with his permission. This because of strong relationship of neighbours that been strengthen by attached walls, and favourite deeds those they did to each others in saving money.

But, in contemporary architecture where most building are set to building regulations and codes especially set back from all sides which caused setting windows those will not used to satisfy the first principal of privacy and consequently wasteful consumption of space and expenditure on windows, curtains, and external building materials. Nonetheless, setbacks from all sides are also wasteful spaces.

7.3 6 Purification space direction and location
Toilet as a space for purification of body should never be directed towards the Qiblah. Although it is noticed that such space was kept far from guests' or none `Mahram's section, and separated from rooms either outdoors or near stairs and outside the section to avoid smell pollution for dwellers and guests. Such spaces required more privacy too especially for females, yet in contemporary architecture a private toilet was allocated for parents. Another one is allocated for children, and extra other for private domestic worker near to her room. In all more circulation and segregation spaces are needed in between bedrooms and toilet, and again more wasteful spaces.

7.4 Islamic principals and space syntax
However, these general principals affected the Islamic traditional houses and neighbourhoods and their designs. But, only three are those which affect the morphology of spaces within dwellings. They are: privacy; generosity; and segregation between genders after ten years old. In other word they affect the spaces syntax. These

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7 (Al-Islam.com, 2005) Hadith Muslim No: 69, and 3019
8 Direction to Makkah when Muslims praying
three principals are: privacy; generosity; and segregation between genders. These principals direct designers to make guest spaces skirt around private spaces, and verse versa. Because of that circulation spaces are numerous to provide special segregation between such spaces, functions, and values in principals to regard. Courses could be concluded for future designs as shown by Al-Harrbi\(^9\), but professional solutions in satisfying of such principals in space morphology should be shown clearly for designer to benefit and to gain experience in modern design.

These principals seems are restricts for designers and architects, but they provide creativity and more freedom in designing house but limits are set to control any harm or damage that may be caused to neighbours and dwellers, or wasteful consumption of space or materials that cause waste of money. Moreover, such principals sometimes promote good relationships between neighbours, and avoid any illegal relationships between genders to reserve values and morals between people and promote a coherent society. However before exploring contemporary dwellings and principals for future houses, traditional houses should be explored and this is discussed below.

### 7.5 Theme of traditional house

![Figures 7.1 & 7.2: Examples of Al-Madinah Traditional Houses](image)


\(^9\) (Al-Harrbi, 1998) p: 9
The traditional house is a complete dwelling either consisting of one floor and a courtyard, or two floors and a flat roof area. Both figures below (no.7.1 & no.7.2) show typical traditional houses of Al-Madinah. Al-Madinah's houses were unique in their quality in both Islamic and Eastern countries. Mustafa (1981) states that residential buildings ensured the privacy that suited social relations and conditions with regard to Islamic law.

### 7.5.1 Type of dwelling unit 'the quality'

Al-Madinah houses were usually joined to each other and were surrounding an open space, called a 'Hoash' as mentioned before in chapter 5. Only a few houses now have their own gardens or courtyards as mentioned by Burckhardt (King, 1998). The picture below shows the entrance of a Hoash and a row of houses within. It shows typical events happening in a Hoash during the festival of Eids\(^{10}\) or Marriage Parties. The Prophet's houses were very small and this was as a very strong influence in Al-Madinah. It seems the majority of houses in Ahwash were small in area as shown above.

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\(^{10}\) Eids are two festivals in Muslim society. The first is Al-Fitr, which occurs after the end of Ramadan and starts four days on the tenth Arabic month. The second is Al-Adh'ha which starts on the tenth day of the last month of Arabic year and for four days during Hajj period.
Figure 7.3 shows how houses were attached together. They were long and the frontages were very narrow, about eight metres for each house, and all had small areas. These houses were in existence until old Madinah was demolished for the Project of Extension of Prophet’s Mosque as shown earlier in chapter two. Large houses started appearing in the Abbasi period and remained until 1910. They were similar to those in Sham. They were like palaces with gardens and waters (Mustafa, 1981) but they were very limited and only appeared on main streets such as Wadi Aqeeq, and A’nbrariah Road. Mustafa (1981) states that, according to a census held by the Turks, in 1818 there were 6000 houses in Al-Madinah. He then states that from the plan of Ali Bin Moussa there were about 47 important houses and about 55 public and private gardens. He also quotes that Ibraheem Rifa’at (1901) visited Al-Madinah four times and described that its houses were narrow and irregular and the majority were without courtyards. However, houses of Ashraaf (Shareef as single) were huge, strong and beautiful, with frontages built of black stones and with wooden balcony windows ‘Rowshans and Mashrabiahs’ (Mustafa, 1981). But he states that Batanoni, who visited Al-Madinah later in 1910 and after Rifa’at, states that wooden elements seemed to be missing in Al-Madinah at that time. Moreover, Mustafa states that Rutter in 1925, during the start of the Saudi era, visited Al-Madinah and gave some descriptions of it. Rutter mostly commented on the attached houses and narrow routes. Mustafa concludes from his field study that traditional architecture of Al-Madinah in the Ottoman period was characterised by two or three houses with small frontages on narrow routes or Azigah (Zogag in single), and surrounding an open space called a Hoash. Frontages were covered by wooden Rowshans or Mashrabiahs (Mustafa, 1981). However this form of house changed dramatically in the Saudi era as a result of the discovery of oil and its revenues.

The mix of residential and commercial uses started in Al-Madinah when Hisham Bin Abdul-Malik constructed buildings in the location of Souq Al-Manakakh. Buildings consisted of two storeys. The ground storey was for shops, ‘Dakakeen’, and the upper storey was reserved for residential use or dwellings as shown below in Figure 7.5.
Figure 7.4: Attached traditional houses are still found in Al-Madinah. This picture was taken by the author in 2000; each house has a frontage that doesn't exceed 8 metres. These are public housing.
7.5.2 Plan and interior design

King (1998) claims Burton described Madinah houses in more detail than Burckhardt. He states that Burton (1853) described the house of 'Shaikh' Hamid Abode, who was one of the poor. It was a small corner house facing northeast. The ground floor was reserved for guests only. The first floor was for the private life of the 'Harem' or 'Hareem' which he could not access to describe in detail.

However Burton's descriptions are very close to the reality of public houses and the majority of dwellings. The author lived in one of these traditional houses on Al-A'nbariah road. It was an attached house and had a western frontage, which did not exceed more than 7 metres, and the depth was not more than 12 metres. Figure 7.6 below shows the floor plan of the house, drawn from memory by the author. The entrance was accessed from street level by two high steps down of dark stone, followed by a shallow one down again to the long corridor, 'Dihleez'. The arched door was a very thick wooden one with a strong lock system named a 'Tirbass'.
Near the entrance there were stands with jars, 'Shirab', of water, jugs of rose water, and the main water tank, 'Zeer Al-Maa', as shown below in Figure No: 7.7. On the left there was an ascending step of 40cm to a seating area which was called 'Dakkah',
which was about 3x4 m with large caged wooden windows for light, enjoying the cool wind, smoking water pipe, and preventing burglary. On the right side of the entrance there was a guest room 'Al-Majlis' measuring approximately 3 x 3 m². It was accessed by a single step from Dihleez, furnished with a main rug in the middle and high mattresses for seating with some rest pillows and mats, as shown in the picture below (Figure no.7.8).

![Image of a room](image)

**Figure 7.7: Entrance facility of cold water for incomers, being one metre down from street level provides a cooling system for jars, jug, and tank, and provides more humidity of dry weather in Al-Madinah 1**

The room also had windows similar to that in Dakka. Its door was in the middle for privacy and made of very thin wood with a simple locking system. Behind the guest room, 'Al-Majlis', there was a room called 'Qa’ah, or Dor-Qa’ah’. It was at the same level of Al-Majlis but larger in area at about 17.5 m² (5m X 3.5m). This was used as a men’s room, where the men dined, and engaged in other activities including afternoon sleeping.
Its area was almost the same as Al-Majlis with a similar door. It had a half ceiling, with the other half rising up to roof level with a skylight or 'Minwar' for light and air. On the other side and behind the sitting area, 'Dakka', there was a narrow area used as a storage area for food, followed by a windowless washing area, which was used for purification. It had a tank of water or 'Hanafiyah' and was also used as a kitchen for occasions and parties. Beside it there was an area with a high small window, where there was a covered septic tank under the ground and the floor was used as storage for charcoal and wood. Charcoal is popular because it absorbs any bad smells but was mainly used for water pipes and incense. It had only one small high window under the ceiling for lighting the area and air circulation. The ceiling of the ground floor was approximately 4m high.

The width of the corridor, 'Dihleez', did not exceed 120 cm, it ended to the right and entered the stairs; under which there was the ground floor toilet. On the ground floor there was only one small high window in the back wall to light the stairs, which were made of black stone from the lava surrounding Al-Madinah with a height of 30cm each, with seven each side, plus another three to reach the first floor. Straight away on this short Dihleez, there was a small high window and a toilet on the left side without a
door. The toilet was up two high steps with a parallel split of 15 cm width in between for drainage from a single jug.

The entrance of the first floor or private floor, 'Hareem', was one step down from the level of the upper Dihleez. It had a wooden door stronger than those of Al-Majlis and Al-Ga'ah, with a stronger locking system. On the left of the entrance there was a washing area with a simple door, it had a small window on the Dor-Ga'ah wall. On the right of the entrance there was a laundry area with a skylight in the roof. It seems to have been used as the main kitchen but its use changed over time. The kitchen at that time was the room next to the laundry; it was windowless with a larger area than the laundry. Next to the kitchen there was a similar store to that in the ground floor. The corridor ended with two doors, in front of which there was the main living room.

![Figure 7.9: Sitting area in the living room beside Rawshan and Mashrabiah, to enjoy the cool wind and view Al-A'nbariah Street.](image)

This was a square area of 16m² (4x4). It was a multi-functional room used for sleeping; as a guest room for women; watching the street from its two oriels 'Mashrabiah' with outshoot about 40 cm from the walls. Both had slide windows (up and down wooden shutter boards), open out planking, reed blinds, and circular holes as bases for 'Shirab'
Chapter Seven: The Quality of Dwelling Unit and Space Syntax

or water jars to sit in. Windows had seating areas like those on the ground floor for dwellers to sit and enjoy the breeze, to have tea or coffee and view the street which was the main one in Al-Madina that visitors from Makkah had to take to reach the Prophet’s Mosque.

The left room was the main bedroom, which was the largest room in the dwelling. Its single window was large but gave more privacy than those in the living room, which was called ‘Rawshan’. It was not a Mashrabiah but a normal large frontage window, as shown above in Figure No 7.4. The ceiling in the first floor was about three metres high.

Out of the first floor entrance there were stairs leading to the flat roof. The stairs had one single small window and ended with a small roofed area, which was called ‘At-Tairamah’. This was used as a store for mattresses, rugs and other things when sleeping in summer on the roof and did not exceed 2 m high.

Next to At-Tairamah there was a small toilet and washroom with a small window. The exit to the roof area was door-less. Three main areas were open to the sky. The last area from the exit was the frontage area with two small woodless windows, and two gutters, ‘Mizab’ or ‘Mirzab’. One small area was semi-closed by walls but without a ceiling for private sleeping, used especially by young girls. It could also be used for future extension as a small unit for a son or daughter when they married. The main area had many uses; for girl’s playing, family sleeping at night, drying washed clothes and drying meats in the Hajj season. The small area near to the exit was useless and had been converted into a cage room for birds (doves and chickens).

7.5.3 Plan syntax of traditional dwellings

Space syntax diagrams show how Islamic culture in Al-Madinah affected the design of dwelling units in past and present and will do in future. These figures show the application of Islamic principles in the various types of dwellings. Space syntax analysis shows that culture is a constant language of spaces’ morphology even if transformation occurred in the forms of buildings. Spaces in space syntax diagrams are shown in circles, squares, rectangles, and letters within to give more easy understanding of the function of each space within the whole dwelling. Links of lines between spaces means doors, or shifting arc. Enclosure polygons are only to show where private sections and guest sections are located. When the line is curved then it means that ring
and integration between many spaces with each others. In all, space syntax diagrams are key analysis of the design of dwelling and the culture of people who live within. Syntax is to be used for some analysis for exploring spatial configuration as a variable for social, cultural, and behavioral implications of Al-Madinah traditional and contemporary dwellings as stated by Bellal (2004). Moreover, because of the similarity between the author’s description of the house above, Burton’s description of the house where he resided (quoted by King, 1998), the above plan can be considered to be a typical plan for the most common traditional houses in Al-Madinah.

Plan syntax in Figure No.7.10 below shows the main route to the furthest spaces is through both the Dihleez and the stairs. The deepest space on the ground floor is the septic tank space. This shows how they managed to place it far from residents or guests to avoid any bad smells if the septic tank flooded. On the other hand, the nearest spaces are those for guests, such as Al-Majlis and Dor-Ga’ah. This is in accordance with the principle of generosity. The privacy principle is applied by the furthest spaces in the dwelling being those on the roof, allocated as the private section of the family ‘Hareem’. Neighbour’s rights are applied in terms of attached houses that structurally supported others, and where no windows view the neighbour’s roof or invade their privacy. Moreover, walls were very thick to insert beams of the adjacent house. Yet each adjacent houses share one wall in between.

In both structures there is no ring or loops that reflect symmetry and distribution of space with full integration and simplicity. The mean depth of the two traditional houses as a whole satisfies the households need for privacy, with a rating of 7.5 for both. Depth is rated 8 in Basrawi’s house (plan b) because it contains more floors, but single depths for each space is not more than 2. Only two spaces are segregated in Basrawi’s house because the house was near the Prophet’s Mosque and was used as a guest house, as most houses were for Pilgrims during Hajj and visitors in other seasons.

On the other hand, Anbariyah’s house (plan A) on the left side of the figure above has five single spaces that have the same depth rating of two, and the same entrance space. It is the Hareem space that offers privacy for the family household as shown in figure 7.10 below. An extra toilet is on the ground floor in the septic tank space to avoid any smell pollution. Such spaces are asymmetric and segregated from the rest of the system. Segregation here is not a negative point, as it provides more privacy that satisfies social values regarding religion, and refines bad smells.
In general space syntax for both show how Islamic principles have been applied to satisfy the values and cultural beliefs in the traditional architecture and morphology of spaces within. These principles should be revised in contemporary dwellings to evaluate how far they are from Islamic culture or how Islamic cultural issues are sustained in the morphology but transformed in the external shapes and forms. Space syntax analysis should be used for Al-Madinah contemporary dwellings as shown below in sections 7.5 and 7.6.

Figure 7.10: Gamma diagram shows A‘nbariah house and Islamic principles that have been applied in the morphology of spaces.

### 7.5.4 Building materials

Traditional housing was painted using white ‘lime’ plaster. The ground floor was built with large basaltic scoriae and mud and the ground was cemented and straightened. The ceiling was made of very hard wooden trunks topped by date-sticks laid across, covered by palm leaf mat, and then covered by mud mixed with lime. The main entrance door was very thick and made of strong wood, but all the other doors and windows were made from softer woods to allow the making of arches and half circles.
across sticks for ‘Shish’ in Mashrabiah and Rawshan. Iron was used in windows as a grid in large spaces for security. The first floor was built of burnt bricks and mud. The ceiling differed from the ground floor only in that the trunks were made of palms. Walls on the roof were all made of burned bricks except the one of At-Tairamah, which was made of small basaltic black and sharp scoriae. The surface of the roof was cemented and levelled to drain rainwater into the two gutters.

All the above descriptions of traditional dwellings in Al-Madinah are supported by Burton, Keane, al-Batanoni, and Al-Ansari as quoted in King (1998). Most of these houses consisted of one or two storeys. However, houses which were more than two storeys and near to Prophet Mosque were either of mixed use and mostly owned by wealthy families and Sharifs. Only a few houses had back yards with water wells. Nevertheless, the majority lacked courtyards as quoted by King from Keane (King, 1998). Moreover, Mustafa states that houses in Al-Madinah had small frontages and were deeper inside and higher buildings with shops were found around the Mosque {Mustafa, 1981}.

According to the above plan and those sourced from Mustafa (1981) and shown in the Appendix, the most noticeable issues are:

- Entry for guests is always to the right when going into rooms and left for toilet, upstairs, or when leaving
- Separation of stairs and toilet areas from other rooms and areas
- Small areas of rooms
- Very thick walls
- Non symmetric plans, with each floor being different from the other
- Each building is a unique dwelling with two toilets or more
- Multi levels on each floor
- Simplicity in materials and furniture
- Multi-use for spaces and rooms
- While boys had Hoash to play in, girls had the roof floor for the same use with privacy and security
- Not all rooms had windows, and if they did it was only for air and light, except frontage ones
- Total area of both ground and first floors is about 208 m²
Each building had its unique plan and design which made it very difficult for strangers to break in and get out very easily.

Al-Madinah's traditional houses were a unique form of dwelling that lacked a courtyard in most cases and contained single dwellings in each building. It satisfied the social and economic conditions of residents and reflects this in the frontage of the building. The general facade of the dwellings was usually simple. Moreover, it reflects fellowship with the houses of the Prophet (P.B.U.H) and the area of rooms is almost always the same, where the largest one is about 17.5 m² as was the inner room of the Prophet (P.B.U.H) (5m X 3.5m). Houses of the Prophet's (P.B.U.H) Companions had direct gates to the area of the mosque (Al-Harrbi, 1998). Al-Harrbi states that 'Creswell indicated that the Prophet initially built the mosque as the courtyard of his houses' and of his companion's houses. Courtyards were shared with neighbours and were not private. Most dwellings are attached together with a very integrated urban form for the neighbourhood and the whole city, as shown before in chapter five. Furnishing was also simple and reflected a resident's wealth.

All Islamic principles and laws in terms of personal needs and others rights are considered during the design and building process. Extending, by building extra rooms on the roof, was incremental and occurred when needed for new generations of the family.

This, along with other traditional houses in Al-Madinah, should be studied by architects very carefully with regard to Islamic principles and law. It is possible to show the difference between the houses of the rich, those of mid income, and the poor. The house was a spiritual home more than a space to furnish and the rooms remained vacant. Al-Hazmi states that traditional small rooms were active and full of life but modern large ones were not, saying:

'Nowadays, our rooms are very large but most times are vacant, on the other hand in past, they were small (3.5m X 3m) but very busy and active with visitors of neighbours and relatives'. (Al-Hazmi, 2001)

So, it is not the large house that enhances the visits of both neighbours and relatives, for small traditional houses were full of visitors and active at most times of the year. It is the values that built up those houses and they sustained these values for 14 centuries in Al-Madinah. They are based on old Arabian traditions and were confirmed by the Prophet (P.B.U.H) or not prohibited. Then Islamic principles and values came from the...
Prophet (PTBUH) as law from all the resources (Quran, Sunna, Ijma’a, and Qiyass) {Kaki, 2000}. In general they shaped the urban form and size of houses and neighbourhoods and consequently the whole city then developed an urban texture, which shaped the people so they were well known for their kindness more than any other city. However, with the current nationalised building regulations, the built environment has almost the same inhabitants as those outside Al-Madinah. This is a common phrase anyone may hear if Al-Madinah is mentioned by any Muslim from any other country. The phrase in Arabic is: ‘Taibah attayibah wo ahlaha attayibeen’, which roughly means: ‘Taba; the kind place and the kind people’. It echoes what Churchill said: That people form the building and then buildings form the people. However, to understand why Al-Madinah people start moving from their customs we should investigate the change of contemporary buildings.

On the other hand, the contemporary built environment in Al-Madinah has been transformed, as shown before in chapter five, not only in the neighbourhood but also in the contemporary dwelling units.

### 7.6 Theme of apartment dwellings

High rise buildings can be defined as a suite within a multi-storey building which was designed for separate households with all their utilities. In Al-Madinah apartments are available either in high-rise buildings, within the Second Ring Road’s zone, or in two storey buildings outside the Second Ring Road, as allowed by building height regulations. Apartments make up 69.3 % of the total residential units in the questionnaire’s data and 64% of permissions data (Tables 6.1 & 6.2 above).

The high percentage of apartments is due to the large plot area in general and high land values within the Second Ring Road. Moreover, chapter two shows how migration to Al-Madinah is high locally from Al-Madinah region, and external from other regions and countries. Therefore, landlords seek to impose higher revenues in exchange for the high demands of consumers (tenants). Al-Hazmi, an estate agent, quotes that:

‘Demand for apartments is very high but apartments supply is very low. This maybe due to that most of residents of the Al-Madinah surrounding areas have left their villages because they are no more enough revenue from farming.’ (Al-Hazmi, 2001)
7.6.1 Who are dwellers?

By selecting only apartment dwellings, SPSS analysis shows that dwellers in apartments, according to their socio-economic characteristics, are mostly Saudi families. Only one tenth of households are Non Saudi as shown below in table 7.3. The majority of households are living as families and only approximately 15% of those are either single or other, including widows or divorcees (Table no. 7.4). Three quarters of apartment households are employed either in the public or private sector, the remainder are unemployed, retired, or students (Table no. 7.5). The majority of household heads are undergraduates, either with bachelor or lower degrees. Only about 7% have higher education, those who have primary or intermediate education total approximately 11.5%. The illiterate are in the minority (Table 7.6). Approximately 44% of total apartment dwellers do not have any extra residents in addition to the family household. On the other hand, about 41% have one domestic worker, 7.6% have a domestic worker and driver, 6% have relatives, 0.5% have a domestic worker and relative, and 1% have all of them (Table 7.7). Approximately two fifths have more than one employee in a household (Table 7.3). About 57% of total apartment dwellers do not own a plot of land (Table 7.3). Only 20% of the total apartment household have applied for or received building permits (Table 7.3). This means that they have land and yet they applied for building permits. The total monthly income of households living in apartments reflects that they are the intermediate income groups in Al-Madinah. Only 20% of them earn SR 3,000 or less. However, if the cut-off point rises to SR 8,000 or less, then the cumulative percentage is about 64%. The largest percentage income group is the one that earns between SR 6,001-8,000. The most astonishing percentage is those who earn more than SR 10,000 but are still tenants in their dwelling and within apartments, as shown below in Table 7.8.

Table 7.3 Apartment dwellers and some socio-economic answers from questionnaires

<table>
<thead>
<tr>
<th>Dwellers of Apartments (Flats)</th>
<th>Yes %</th>
<th>No %</th>
<th>Total valid number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saudi</td>
<td>90.8</td>
<td>9.2</td>
<td>185</td>
</tr>
<tr>
<td>Multi employee in household</td>
<td>39.5</td>
<td>60.5</td>
<td>185</td>
</tr>
<tr>
<td>Own a plot of land</td>
<td>43.2</td>
<td>56.8</td>
<td>183</td>
</tr>
<tr>
<td>Applied for building permit</td>
<td>20.1</td>
<td>79.9</td>
<td>185</td>
</tr>
<tr>
<td>Applied for REDF loan</td>
<td>58.3</td>
<td>41.7</td>
<td>36</td>
</tr>
</tbody>
</table>
Table 7.4: Martial status of apartment dwellers

<table>
<thead>
<tr>
<th>Dwellers of Apartments (Flats)</th>
<th>Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>24</td>
<td>13.0</td>
</tr>
<tr>
<td>Married</td>
<td>158</td>
<td>85.4</td>
</tr>
<tr>
<td>Others</td>
<td>3</td>
<td>1.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>185</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Table 7.5: Employment status of apartment dwellers

<table>
<thead>
<tr>
<th>Dwellers of Apartments (Flats)</th>
<th>Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Employed</td>
<td>12</td>
<td>6.5</td>
</tr>
<tr>
<td>Employed</td>
<td>130</td>
<td>70.3</td>
</tr>
<tr>
<td>Unemployed</td>
<td>7</td>
<td>3.8</td>
</tr>
<tr>
<td>Retired</td>
<td>14</td>
<td>7.6</td>
</tr>
<tr>
<td>Student</td>
<td>8</td>
<td>4.3</td>
</tr>
<tr>
<td>Others</td>
<td>14</td>
<td>7.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>185</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Table 7.6: Educational status of apartment dwellers according to qualifications

<table>
<thead>
<tr>
<th>Dwellers of Apartments- Educational Status</th>
<th>Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannot read or write</td>
<td>5</td>
<td>2.7</td>
</tr>
<tr>
<td>Can read and write</td>
<td>10</td>
<td>5.5</td>
</tr>
<tr>
<td>Primary school</td>
<td>11</td>
<td>6.0</td>
</tr>
<tr>
<td>Secondary school</td>
<td>22</td>
<td>12.0</td>
</tr>
<tr>
<td>Higher school</td>
<td>39</td>
<td>21.3</td>
</tr>
<tr>
<td>Bachelor degree</td>
<td>83</td>
<td>45.4</td>
</tr>
<tr>
<td>Higher degrees; MSc, PhD</td>
<td>13</td>
<td>7.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>183</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Table 7.7: Apartment dwellers with extra residents within the dwellings

<table>
<thead>
<tr>
<th>Dwellers of Apartments with extra members</th>
<th>Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>81</td>
<td>43.8</td>
</tr>
<tr>
<td>Domestic worker</td>
<td>76</td>
<td>41.1</td>
</tr>
<tr>
<td>Servant and driver</td>
<td>14</td>
<td>7.6</td>
</tr>
<tr>
<td>Relative</td>
<td>11</td>
<td>5.9</td>
</tr>
<tr>
<td>Servant and relative</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>All</td>
<td>2</td>
<td>1.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>185</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Table 7.8: Apartment household's monthly income groups (SR)

<table>
<thead>
<tr>
<th>Income Groups</th>
<th>Frequency</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 SR OR LESS</td>
<td>6</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>1001-2000 SR</td>
<td>15</td>
<td>8.2</td>
<td>11.5</td>
</tr>
<tr>
<td>2001-3000 SR</td>
<td>16</td>
<td>8.7</td>
<td>20.2</td>
</tr>
<tr>
<td>3001-4500 SR</td>
<td>21</td>
<td>11.5</td>
<td>31.7</td>
</tr>
<tr>
<td>4501-6000 SR</td>
<td>22</td>
<td>12.0</td>
<td>43.7</td>
</tr>
<tr>
<td>6001-8000 SR</td>
<td>37</td>
<td>20.2</td>
<td>63.9</td>
</tr>
<tr>
<td>8001-10000 SR</td>
<td>31</td>
<td>16.9</td>
<td>80.9</td>
</tr>
<tr>
<td>More than 10000 SR</td>
<td>35</td>
<td>19.1</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>183</strong></td>
<td><strong>100.0</strong></td>
<td></td>
</tr>
</tbody>
</table>
7.6.2 Quality of apartments

The quality of apartments is strongly related to the number of its inhabitants. Qualitative satisfaction of dwellers is measured in qualitative and quantitative measures. Apartments in Al-Madinah differ in their quality according to their rooms, locations, frontage of the building, building entrance, number of rooms, number of toilets, number of neighbours, whether there is an elevator or 'lift', type of building, direction, finishing, flooring, kitchen and air-conditioning.

According to the table 7.9, approximately 58% of apartment dwellers are not owners of their dwellings, but private tenants. On the other hand, only 35% of total apartment dwellers are owners or related to owners. One third of households earn less than SR 3000, which means that they are not the real owners. Consequently, it decreases the percentage of apartment ownership to only 28% \{(65-13) / 185 \times 100\}. This means the majority of apartment dwellers do not tend to own their dwelling, or do not have the means to do so.

Table 7.9: Apartment ownership and holding

<table>
<thead>
<tr>
<th>Apartments ownership</th>
<th>Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner/ owned by relative</td>
<td>65</td>
<td>35.1</td>
</tr>
<tr>
<td>Private tenant</td>
<td>108</td>
<td>58.4</td>
</tr>
<tr>
<td>Public tenant</td>
<td>7</td>
<td>3.8</td>
</tr>
<tr>
<td>Tenant by employer</td>
<td>5</td>
<td>2.7</td>
</tr>
<tr>
<td>Total</td>
<td>185</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Rent ranges from between SR 3,000 to SR 38,000. The mean is about SR 15,900 and median is SR 16,000. The most common amount of rent is about SR 20,000 (Mode value), which is for an apartment with three bedrooms. Low rent values are available for very small apartments within old districts, informal areas, or public 'council' housing such as 'Ribaatt'. Rental value in such areas is very low, about the minimum shown in the Tables 7.9 and 7.11. Such apartments are designed for the poor according to their low income but regardless of their social references.

Poor quality apartments are assessed according to their design, maintenance, appearance and neighbourhoods. Yet to have a basic three bedrooms apartment (standard one) you would be expected to pay at least SR 20,000 annually. Al-Ahmedy, who has a family of nine members and resides in an informal area within his fathers building, states that:

---

11 Ribaatt is a high-rise building with multi dwellings for the poor is mostly developed by private sector of rich families as good deeds for the life after death.
Rent is too expensive, so that I am living in a flat of my father's house, but if I go out and looked for those flats, which are enough for size of my family, rent will not be less than SR 20,000, which is too high regarding my income (Al-Ahmedy, 2001).

Such apartments have basic, standard and the most common flooring, paints, toilets, pipes, doors, and usually no lift in the building. Such buildings were usually built in informal areas or old districts within small plots. Therefore, they usually only have two bedrooms and two toilets.

In new districts apartments are often very large. The majority have at least three bedrooms, and three toilets. All rooms have Moroccan decorated roofs of plaster, marble ceilings, golden door handles, toilet taps and showers, and central air-conditioning. Such an apartment is called super deluxe. The rent value varies from SR 25,000 to SR 38,000. Some have at least five bedrooms, five toilets, underground car garage, intercom system with LCD, and a shared room for a driver to sleep in with others within the roof area or on the ground floor. These apartments tend to be the same quality and rent value for 15 years and then run into disrepair because of low maintenance and problems caused by youths. Apartments located in Ardh Al-Bahar are an example of where, 15 years ago, the neighbourhood was of the highest quality and populated by engineers, doctors and other young wealthy households. However, when all the plots were developed, some sections ran into disrepair and children, especially boys who had been kept inside apartments during their early years, became teenagers and were able to stay outside on streets. This led to problems with neighbours and others using the space. Another example of this is the Ardh Al-Kordi district.

Table 7.10: Apartment tenure for those earn less than SR 3,000

<table>
<thead>
<tr>
<th>Apartment tenure within income &lt;= SR 3,000</th>
<th>Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner/ owned by relative</td>
<td>13</td>
<td>35.1</td>
</tr>
<tr>
<td>Private tenant</td>
<td>17</td>
<td>45.9</td>
</tr>
<tr>
<td>Public tenant</td>
<td>5</td>
<td>13.5</td>
</tr>
<tr>
<td>Tenant by employer</td>
<td>2</td>
<td>5.4</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 7.11: Statistics of apartment annual rent value (SR)

<table>
<thead>
<tr>
<th>N</th>
<th>121</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>15,901.6</td>
</tr>
<tr>
<td>Median</td>
<td>16,000</td>
</tr>
<tr>
<td>Mode</td>
<td>20,000</td>
</tr>
<tr>
<td>Minimum</td>
<td>3,000</td>
</tr>
<tr>
<td>Maximum</td>
<td>38,000</td>
</tr>
</tbody>
</table>
Another reason for this degeneration is because both districts are surrounded by informal areas and older districts, which reduces the demand for apartments in such areas. However, other new districts of new apartments of better quality are far from informal areas. The best apartments now are those available in Ar-Rawdhah and Al-A’amir districts, and in some main streets such as King Abdul Aziz Road and Airport Road. Nevertheless, apartments in buildings with two storeys are also more attractive than those in old districts because they have fewer problems and they are safer for young families and their small children. Other factors for households and dwellers are proximity to services and amenities such as schools, clinics, mosques, and work locations, as shown in a previous chapter.

![Bar chart for length of stay in apartment dwellings](image)

Figure 7.11: Bar chart for length of stay in apartment dwellings

Many apartment dwellers do not stay very long in the same apartment. Over half moved to their current apartment in 5 years or less. One fifth of households have lived in the same apartment from between 6 and 10 years. Only about 1.5% of them have lived in their apartment more than 25 years. The remainder range between 11-25 years. Figure 7.11 not only shows bars but also shows behaviour of changing dwellings with periods of time. It shows that more than half of apartment residents change their dwelling within five years or less. This behaviour is either because of an increase in the amount of rent; looking for better quality; or to move to their own dwelling if they manage to build or got a housing unit from the Housing Project.
7.6.3 Plans of design and space syntax of apartments

Contemporary apartment designs are almost all the same in Al-Madinah and might be similar to those in other cities within Saudi Arabia, as shown before in chapters four and five, in which it is stated that generalized building regulations caused the nationalising of designs of dwellings, especially in approved plans where areas of plots are almost all the same. Gamma diagrams of apartment plans differ regarding the number of spaces, depth, number of total spaces, form of transition between each type which reflect their integration or segregation and consequently social integration {Bellal, 2004}. In other words, it shows the degree of spatial and social cohesion. Gamma diagrams are drawn for most typical plans sourced from Al-Madinah Municipality’s archives. As shown below, space syntax is used to calculate the structure and relations of spaces to each other within the plan of a dwelling. Gamma diagrams are shown related to designs of most typical layouts for different qualities of apartment.

- Single bedroom apartments

The gamma diagram shows the apartment divided into spaces and abstracted from scale and directions into circles and segments. For a one bedroom apartment the total number of spaces is seven. The depth is four and the deepest spaces are the bedroom and toilet. Spaces are symmetric. The apartment was built in 1998 and is located in one of the areas in highest demand. Simply it is shown as a linear dwelling where rooms have windows on the back and sides of the building, and toilets and a corridor act as a barrier between adjacent shops on the front of the building. The principle of privacy is well applied even if such small dwelling is not designed for a household, but might be for a driver or a small non Saudi family where privacy is less important in design.

The gamma diagram below shows that the bedroom is the deepest space, or most private space, and there is only one toilet in the dwelling. Such dwellings are designed on the surplus area after frontage areas are designed as shops spaces. Yet, and the rest is left for small dwelling that may fit singles or young family without children. On the other hand, the guest room (G) is kept near to the entrance with no toilet, but far from the private section of bedroom and the toilet (BR& T), and segregated with three spaces in between (L, LV, & L).
On the other hand, an example from the informal area, and built almost in the same year, has another shape of space syntax. It has the same depth but differs in the number of spaces. Figure No 7.13 below shows how depth remains constant and the spaces are increased to nine. Moreover, both the guest room and the bedroom retain windows on streets or are set back from the building while the living room, dining room, and kitchen are next to adjacent neighbouring buildings. On the other hand, diagrams reflect distribution of space and how it differs when there are two entrances that cause the existence of a loop or ring. Extra spaces on lower floors are for an inner lobby and toilet for the bedroom, and a dining room. The loop shown in grey in Figure 7.13 provides more accessibility either from the men’s guest room to the dining room to the private section of living room, or kitchen for the dwellers, and from outside for guests. It means that spaces in this plan are more integrated than the previous one regarding the guest section. The inner toilet is segregated from the rest of the system to provide more privacy for residents from guests. Accessibility to a toilet seems difficult for all guests in the first plan and for female guests in the second. This form of dwelling is very rare and only designed in very small plots, or on the ground floor backing onto shops in multi storey buildings.

Such dwellings are suitable for single males who live as students or workers. Architect Abazah, who lives in Medina and works at a consultant’s office, cannot afford a flat of
high quality because he is a non-Saudi single man, and cannot find a place to be let to singles. About the quality of traditional architecture and contemporary buildings, he comments that

'I can not afford adequate apartment with good quality because I am a single man'. (Abazah, 2001)

Figure 7.13: Space syntax ‘gamma diagram’ for plan of one bedroom apartment within informal district

- **Apartments with two bedrooms**

These have more depth and spaces. In Figure No. 7.14 below the distribution in the upper apartment (a) seems very integrated and symmetric, but in the lower one (b) with two entrances, integration with external space is greater. Yet, two guest spaces are segregated from the rest of the systems. The lower design with two entrances provides more choice for entry and separate entrances for guests or household members. On the other hand, design of plan A does not have such choice with only one entrance. Both have inner (deepest) spaces for bedrooms, inner toilet, and kitchen.
Private sections

Parents privacy is protected by providing an extra bedroom for children (BR2).

Neighbours' rights are protected in design where living room and guest room are allocated from party wall to avoid causing any noise. The attached walls are used to allocate kitchens and bedrooms which are more quiet than children's bedrooms.

Entrance Creation

Guest room

Shop

Figure 7.14: Space syntax for two apartments within one floor

Plan B seems to be typical as it is the same in another example for permit no 400 (see Appendix 7, figure of space syntax for apartments with two bedrooms). These types and sizes occur in the majority of apartment dwellings, they account for about 50% of the total. Owners develop them for extended families and they would be occupied by the youngest families. Such dwellings may have six people in the household. Parents sleep in the master bedroom and children and other relatives or domestic workers may share the other bedroom. It is sufficient in terms of the large area and type of mattresses used for sleeping rather than beds amongst low and medium income groups.

But when children reach ten years old, separation of females from males is compulsory, as commanded by The Prophet (PBH). Therefore more bedrooms are needed and if the households do not have the financial capability to own their own dwelling they tend to live in larger apartments where young children and domestic workers can be
accommodated. Yet, apartments with two bedrooms are not the most common dwellings for Al-Madinah residents but they still show the applications of Islamic principles according to space morphology and space syntax analysis.

- **Three bedroom apartments**

The most typical design is shown below in Figure 7.15. It is widely spread throughout new dwellings in Al-Madinah. Beside the plan there is a diagram for space syntax distribution of spaces and rooms within apartments with three bedrooms. The majority of such apartments have three bedrooms; two guest rooms (males and females); dining room; a minimum of three toilets; one kitchen and a living room. Space syntax seems to be symmetric evenly distributed and this is very clear in both sides where spaces 4 & 9, and 2 & 7 are for separate sections of guests for males and females. All other spaces, such as bedrooms, inner toilets and the kitchen, have been given the most depth for more privacy (spaces from 18-21).

While one toilet should be enough for three bedrooms, because of the existence of non-family members and domestic workers in most households, a private toilet tends to be in the master bedroom, and the other one is for the use of children and domestic workers. The dining room is the central space between both guest sections. As shown below, it is a bit difficult to move between the kitchen and dining room. However in this case, as in most common households, dining as a daily activity is held in the living room and on the floor. The loop is located around the dining room in multi directions. Though the dining room is reserved only for guests it is used for very occasional events. Therefore space is wasted if the household live as tenants.

It is very clear in the plan that spaces 10 and 15 are wasted as corridors to integrate both guest sections with the whole system of the dwelling. In two storey houses such spaces are replaced only by a stairwell. Each guest section is a single unit for two young family members or a household (two adults and one child). However if a household has many children such apartments do not have a space for playing, except in their bedroom with electronic games (if they have any), or on the streets as discussed in a previous chapter. Another example of a three bedroom apartment is shown in Figure no. 7.16 below. It shows how a developer will build multi-story buildings and then sell them as a complete group of buildings or each building alone, but not as single dwellings. The sample was taken randomly and the tenant was personally interviewed in a real estate agent office.
Space syntax for apartment with 3 bedrooms

The privacy principle is applied separately for both children and parent's bedrooms; both are in the private section and segregated from the guest section. Gender segregation is applied in bedrooms and toilets.

The generosity principle is applied for both genders equally, and kept integrated with the shared dining room.

Neighour's rights are not affected in terms of noise, except for the upper neighbour, even if the privacy is well satisfied.

Figure 7.15: Apartment with three bedrooms, and its space syntax diagram
The plans and gamma diagram below for apartments with three bedrooms and the rest of the storeys and buildings are the same as shown in the diagram. The developer was using the same plans from his past experience and did not listen to input from designers on the design of the buildings or the requirements of the dwellers because he sells the multi-storey buildings. The developer is not in direct contact with residents, but only with other developers or investors. He is looking to keep costs low and receive fast revenue. The design of the building is not an issue for the developer because he does not intend to live there.

Figure 7.16: Plan of three bedroom apartment and space syntax diagram. The developer's decision and his traditional thoughts in terms of design are very clear. The only addition is an open door between the guest room and dining which forms a loop to integrate a guest section as separate from the private section to provide more privacy. Moreover in the private section, boy's bedrooms are kept near to the dining room but the girl's near the master bedroom are kept deep after living room and each has its own toilet.

This example shows the designs before 1980; they are still used by developers as a model and they offer the building to other investors who only care about quantity rather than quality. The movement from entrance to last space is not too deep in such examples. The maximum depth is seven with no loops, symmetry or distribution. The only loop is within the guest section, where spaces within are segregated from the rest.
of the system. Moreover, this dwelling with one entrance does not allow more choice of entry or provide privacy for dwellers from the guest section. However it does separate the guest section as shown, with the dining room separated from the rest of the system. The inner or deepest spaces are left for storage, and a master bedroom. All rooms have views from the outer walls. The only inner space is the kitchen, which is located near a sky-light. The majority of the 3 bedrooms apartments have segregated guest sections and master sections. The guest section has a guest reception room, toilet, and dining room. The master section has a master bedroom, toilet, and in a few, a dressing room or storage for clothes.

- **Apartments with four bedrooms**

Apartments with four bedrooms do not differ a great deal from other apartments. Extra spaces include a toilet, and one bedroom for a large family; in this case the bedroom is always located near other bedrooms. Otherwise, there is a room for a domestic worker with its own toilet usually located near the kitchen. The depth in the example shown below in Figure 7.17 is five. The deeper spaces are toilets, children’s bedrooms and storage areas. While the number of spaces does not exceed 20, this apartment’s measurements are not the optimum for saving space. The dining room is missing here as a traditionally use living room for dining as multi use space. The living room seems to be used as a dining room when guests are invited. The second bedroom, as a separate unit with its own toilet, seems to be for the use of relatives when visiting, or female relatives who live with the household. The master bedroom is situated far from the others and segregated from the rest of the system with its own toilet and study for reading. The master section is branched as the guest section but it is given more depth. The storage area is related to the kitchen and often used as a bedroom for a domestic worker to sleep in. The only loop is left for bedroom no.4. This may be used as a play-room for children under the care of a domestic worker, and has easy access to the children’s toilet. The most dominant space is the living room as it is where most of the household’s activities occur. Although it is like a playground because of its reasonable large size, in quantitative issues this example will be discussed in the next chapter as a typical wasteful measure. An example for apartments with four bedrooms is shown in Figure 7.17 below.
Chapter Seven: The Quality of Dwelling Unit and Space Syntax

As shown above, the principle of privacy is still applied even in new designs. The private section takes about 70% of the total space of the dwelling, while 25% is left for guest room, living room, and kitchen. The Living room is used as a courtyard for children to play, family dining, as a reception for females if both genders are invited to the home. The library is allocated near to the master bedroom which also has its own privacy with a toilet as segregated section. This section is near to the entrance for more control of the dwellings. Such behaviour might be due to danger that exists outside for children, and yet the living room is an alternative space for playing.

7.4.4 Are apartment dwellers satisfied?

With regard to quality of apartments, households are satisfied to differing levels and have various types of issues. About two thirds are satisfied in terms of space around the house. Moreover, about four fifths of apartment dwellers are satisfied with the dwelling’s size; design; number of windows; building materials; building layout; building structure; building height; building’s location within plot; heights of walls; number of views; and number of entrances. Of course, tenants who have chosen their dwellings are those who are mostly satisfied in general. However, designs are generally
directed by developers and architects of apartments to meet their needs and satisfactions, apart from the contractors who do not deal with tenants directly.

Table 7.12: Satisfaction with quality of apartment dwellings

<table>
<thead>
<tr>
<th>Satisfaction with</th>
<th>Satisfied%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air-Conditioning</td>
<td>92.0</td>
</tr>
<tr>
<td>Natural lightning</td>
<td>87.8</td>
</tr>
<tr>
<td>Building location within the plot</td>
<td>87.0</td>
</tr>
<tr>
<td>Ventilation</td>
<td>86.6</td>
</tr>
<tr>
<td>Building structure</td>
<td>85.7</td>
</tr>
<tr>
<td>Number of windows</td>
<td>85.4</td>
</tr>
<tr>
<td>Building height</td>
<td>85.4</td>
</tr>
<tr>
<td>Number of views</td>
<td>84.1</td>
</tr>
<tr>
<td>Design of dwelling</td>
<td>83.0</td>
</tr>
<tr>
<td>Building materials</td>
<td>81.2</td>
</tr>
<tr>
<td>Building layout</td>
<td>80.4</td>
</tr>
<tr>
<td>Number of entrances</td>
<td>80.1</td>
</tr>
<tr>
<td>Height of walls</td>
<td>79.3</td>
</tr>
<tr>
<td>Set back from sides</td>
<td>63.1</td>
</tr>
<tr>
<td>Set back from front</td>
<td>61.5</td>
</tr>
<tr>
<td>Smell pollution</td>
<td>58.3</td>
</tr>
<tr>
<td>Noise pollution</td>
<td>48.2</td>
</tr>
<tr>
<td>Shape of courtyard</td>
<td>30.0</td>
</tr>
<tr>
<td>Availability of garage</td>
<td>29.4</td>
</tr>
<tr>
<td>Possibility for extension</td>
<td>29.4</td>
</tr>
<tr>
<td>Garage location and type</td>
<td>10.8</td>
</tr>
</tbody>
</table>

On some issues, residents do not seem to know why some building regulations are in place, or do not benefit or are not affected by some policies. An example is building height; most apartment dwellers, mostly tenants, are satisfied with this. However, developers would prefer increased height as this will increase their revenues and they are currently limited by such policies. Moreover, about 90% are satisfied with the natural lighting and ventilation. This may be because the majority of dwellings are provided with air-conditioning because of the climate in this desert city. Table 7.12 below shows the level of satisfaction in percentages regarding apartments and their qualities.

On the other hand, dissatisfaction was shown by apartment dwellers with regard to the shape of the courtyard; availability of garages, its type and location and the possibility of extensions. Control or holding power of tenants is very limited; they cannot change the design, extend, or divert any part of the dwelling they live in. The shape of the courtyard that surrounds the high rise building causes total dissatisfaction of residents of the apartments because apartments do not even have courtyard for children to play. Where it is set back from all sides of the plot land and though space is wasted for linear
narrow spaces, especially from both sides. Such spaces are not for tenants to use because it will cause noise for ground floor dwellers. Yet, residents miss the space for their children to play in within the plot boundary and within the neighbourhood as shown in a previous chapter. A garage is very important for the security of vehicles and protection from the heat of the sun in the summer. Apartment dwellers lack such facilities in most apartment buildings, except in super deluxe apartments, which most residents cannot afford. Building regulations do not require developers of apartments to provide shaded garages or parking for all residents, even if there is only one car per apartment. This facility is possible only in villas.

7.7 Theme of villa dwellings

Villa models were originally built for the upper classes in Rome; it has therefore been defined as:

"A house usually in the countryside or near the sea, particularly in southern Europe, and often one which can rent for a holiday". {Cambridge University, 2003}

"A country seat; a country or suburban residence of some pretensions to elegance". {Brainy Media, 2001}

Another definition is: A detached or semi-detached suburban house that serves as a living space for one or more households (Oxford English Dictionary, 2004). As shown above it used to be the dominant model in Saudi Arabia. In Al-Madinah, villas are proposed as the preferred design for any plot outside the Second Ring Road. This does not mean that there are no villas inside the Second Ring Road. Only upper class or rich households can build villas. Thus, only about 21% of households live in villas. Even when residents move to another villa (Al-Fozan, 1993), or rich owners move to another larger villa, or leave for another city, such dwellings have restricted tenants. Tenants are usually companies, private nurseries, or non-Saudi rich families who were not allowed to own properties before 1999, but now can do so. Though residences of villas should be allocated so that it is known how many villas are required for residents of Al-Madinah, is it really the home that most households hope to have as a dwelling?
7.7.1 Who are villa dwellers?

As shown in the tables and figures below, the majority of villa dwellers are Saudis. About 15% of villa dwellers are single, but most are in large family households. The majority of households living in villas have sizes of between 4 and 9 people. Those households between 10 and 12 people are only about 12%. Those who have families of more than 12 or less than three are in the minority. About three quarters of household heads of villa dwellers are employed. The rest are retired, self employed in trade work or the private sector, or unemployed. Dwellers differ in their educational qualifications, about half of the heads of households have bachelor’s degrees. One fifth of households have higher schools certificates or diplomas. Only one tenth have higher degrees such as Masters or PhD. The rest reached only secondary schools or lower. This does not mean that results are false, but that non-educated heads of households may have married a very highly qualified wife, or been left an inheritance from his or her relatives.

Table 7.13: Nationality of villa dwellers:

<table>
<thead>
<tr>
<th>Nationality</th>
<th>Yes %</th>
<th>No %</th>
<th>Total valid number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saudi</td>
<td>98.2</td>
<td>1.8</td>
<td>57</td>
</tr>
<tr>
<td>Married</td>
<td>84.2</td>
<td>15.8</td>
<td>57</td>
</tr>
<tr>
<td>Own plot of land</td>
<td>78.6</td>
<td>21.4</td>
<td>56</td>
</tr>
<tr>
<td>Own the villa or relative to owner</td>
<td>94.7</td>
<td>5.3</td>
<td>57</td>
</tr>
</tbody>
</table>

Moreover, some of them work in trade and this can result in a higher income than those with educational qualifications. On the other hand, educated people may be affected by the life of educated societies outside Saudi Arabia, or just mimic those from a higher or richer class, as stated by Al-Fozan (1993).

Among villa dwellers, about half of households have domestic workers live with in dwellings. But only quarter of households, have both domestic worker and private drivers. Another quarter of total villa households don’t have any. Only one tenth of villa’s households have relatives living with them. A minority have all of the above living in the same villa. These extra members may affect the design of a villa and the...
relationship of spaces within the dwelling, especially for example a driver who needs to live outside but near the main entrance of the villa. Domestic workers (mostly female) live inside the dwelling and as near to the kitchen as possible, as shown above in some apartment dwellings.

![Size of villa households](image)

Figure 7.18: Size of households dwelling in villas

Relatives such as grandparents or aunts are usually near the children’s rooms but uncles are to be separated from the family sector. Other relatives should stay in the guest sectors. Therefore this section, even in apartment dwellings, is a separate unit to be used in such cases. Villas are usually required for large and wealthy families who have many guests, relatives, domestic workers and a private driver. Figure 7.20 below shows this very clearly. However this does not mean that all villa dwellers are wealthy enough to own the villas they occupy. About one fifth of households who are either tenants or reside with their parents within private areas, as shown in Table 7.13.

Most villa households have not lived in their dwelling for a long time. Figure 7.21 below shows that about half of them have resided in their dwelling for 5 years. In contrast, only about 2% have lived in their villa for more than 25 years. Approximately one quarter of households have lived in their villa for between 6 and 10 years; the remainder have lived there for between 11 and 25 years.
The high ratio of those who have moved to a villa for only a short period of time might be due to those who reside in the villas of the Public Housing Project that were built by the Ministry of Housing over 20 years ago. Allocation of ownership of such dwellings was not made until 5 years ago. The manager of REDF at Al-Madinah was interviewed personally by the researcher to get more details of such projects. The Project includes
more than 2000 villas in Al-Madinah. Villas were not granted on a first-come-first served basis, as in other cities like Riyadh and Makkah, where projects in Jeddah and Dhahran are designed as apartments. About 900 villas in Al-Madinah were allocated to those whose properties were demolished for new road projects.

Figure 7.21: Numbers of years households have lived in their villas

‘The housing project was originally designed for low income groups’ said Architect Al Hazmi, supervisor of the project from Al-Madinah Municipality. The applicants and those who actually received housing are not from the intended group. Therefore, they complain when they arrive that the kitchen is small, there is no room for domestic workers, and walls are too short. On the other hand, most of those who have frontages on streets outside the project start to convert one or two rooms into shops to increase their revenue. They might manage to live within one bedroom, but others in inner streets start to build another floor as another residential unit. Many villas are rented by tenants who left their apartments to move to a quieter area and court yards are available in such villas. However, the increase in renting villas over the last five years has been caused by those who transferred to the Housing Projects.

7.7.2 Plans of design and space syntax of villas

Villas are designed in Al-Madinah on plots with a minimum area of 400 m², 60% maximum built area, two floors, and 25% on the roof. In terms of design, the majority are similar in terms of quantity of rooms and spaces within villas, but not in quality of
the design of spaces. The exceptions are those in the Housing Project, which are the same dwelling units in one floor area. It is common for young families to visit their parents during weekends. Yet, villa dwellers (as parents) take into account their relatives, guests and extra dwellers when visiting during weekend or on occasional visits. Additionally they have considered extra rooms or sections for them but not the guest section, as shown in the apartment houses. To understand the exact differences in quality, villas can be categorized as follows:

- *Housing project villa plan and gamma diagram (space syntax)*

Figure 7.22 below shows a plan and gamma diagram of space syntax for a villa from the Al-Madinah Housing Project. It shows three rings connecting the guest section with the kitchen and living room. With three entrances the dwelling still seems to have a small kitchen and no extra room for a domestic worker or driver. An exit to a back yard from the kitchen encourages dwellers to divert and extend extra space as a room (with a toilet) for a domestic worker instead of the back yard green area. Others add a room in the front courtyard for a private driver. In general, spaces seem well allocated for a dwelling with one floor. When an extra floor is added this means that another dwelling is added, not just more rooms. In both cases the main dwelling, which is for the household use, is static and very limited in scattered corridors or two way spaces. The private section of the ‘Hareem’ or bedrooms is well separated with two toilets, one for the children’s bedrooms, and the other in a suite for the master bedroom. Outside yard space, guest, and living space are integrated with the three entrances. Privacy here does not increase wasted space, spaces are well organized and the maximum depth is 5 as a whole. However, this is only for the master bedroom, and this has been logically planned out. By looking at the plan such design is suitable for extension in vertical or horizontal dimensions. An entrance for a car park allows for a private garage for an extra car. This would be useful when an extension for another dwelling is built on the first floor. The only problem is how upper story residents will access the front and back courtyards and how ground-floor residents will access the roof area.

It is very difficult for Saudi females to go outside alone when there the dwellers who are not relatives on upper floors and the case is the same when female residents on upper storey try to access courtyards. Moreover and when such villas have been changed in design from single dwelling units to double dwelling units, when strangers reside here it is not appropriate for people of either household to access open spaces around their...
dwellings. This would be the same for those living in apartments in multi storey buildings. Apartments residents always complain about noise, but the real issue concerns privacy or Hareem zone. However if the dweller of an extra dwelling is a relative, then the dwelling will be a villa, but also a family house.

Figure 7.22: Plan of dwelling from Housing Project and gamma diagram for space syntax of plan. It is a three bedroom dwelling unit as a semi-detached villa.

- **Semi detached villa of development project (Al-Khattabi)**

As shown in Figure 7.23, semi-detached villas seem to provide an extra room with a toilet on the front set back for a relative, driver, or domestic worker outside the main dwelling. However with two entrances, the gamma diagram for the main dwellings shows integrated spaces between the two guest sections with a dining space and kitchen. At the same time they are segregated from the private section, which is upstairs on the first floor.
Figure 7.23: Plan of dwelling from Al-Khattabi Development Project and gamma diagram for space syntax of the plan. It is a three bedroom dwelling unit as a semi-detached villa with extra driver’s bedroom and toilet shown as (DBR), and small open area in the front courtyard that cannot be used by females because of the driver’s room. The lowest segregation depth is four to reach private section from male guest section, but is three for female guest section.

The private section contains one master bedroom, two children’s bedrooms and a main kitchen. It is removed from the female guest’s section. The dwelling still applied setback regulations from three sides; i.e. front, back and on one side. Such spaces are wasted with no function except segregation from the neighbours. The plot shape is a long rectangular lot. Moreover, the courtyard is not useable by females due to the position of the driver’s room. The roof area seems more appropriate for female use as it was in traditional houses. The roof open area is not shown in the gamma diagram but it will be even deeper than the depth shown, and will afford more privacy for such use. Furthermore, courtyards can be allocated on the back of a dwelling to segregate it from the driver’s room, and to afford a space for females and young children to play, and be watched and cared for without any conflict of privacy.
*Detached villa in informal area*

Figure 7.24 above shows a plan of a villa in an informal area with two floors, three bedrooms and two kitchens. A gamma diagram shows segregation between sections for female guests from male ones by allocating each one on a separate floor. The male section is on the ground floor and is integrated with the guest’s kitchen but also segregated from the master bedroom section. On the other hand, the female guest room is integrated with the main kitchen, dining and living rooms.

The irregular shape of the plot led the designer to create more usable spaces, and save a lot of wasted ones even if there is some set back from all sides. The living room is used...
as a focal space that all private sections are integrated with, even a female guest dining room. The deepest space is the master bedroom that has a single depth of 4 at the ground floor, but as a whole dwelling with another bedroom and its toilet it has a depth of 7. The irregularity of the plot shape as square or rectangle provides the designer with more creative opportunities, while frequent plot shape does not give any chance for new design but allows for coping with old designs.

- **Detached villa in planned area**

This type of villa is a typical example of how wasteful measures are applied with regard to building codes listed in neighbourhood planning regulations. As mentioned in chapter three, landlords may be permitted to build more than one dwelling in the plot if they are building apartments. However, a permit is only granted for one villa, but this may allow for an extra bedroom in the roof area within the 25% building ratio. Meanwhile, as plot areas are very large, over 400 m², villas are very complicated in the form of Gamma diagram of space syntax of two floors because of the huge number of spaces and rings within. Figure 7.25 shows space syntax is for both ground and first floors which very complicated. A diagram is not only evidence of the Islamic principles applied to architecture, but it shows clearly the wasteful consumption of space.

Space syntax diagrams in Figure 7.25 show the depth of private sections which are segregated from guest sections. Multi sectioning is common in such villas with wasteful measurements. It has eight toilets, two large kitchens, two dining rooms, two guest rooms, five bedrooms, domestic worker and driver’s room, and various circulation spaces. An elevator is provided for elderly people to access the first floor. Multi rings are provided for integration between the guest dining room and service from the kitchen. Toilets are always set at the end of each section as in traditional housing. Almost half of a villa’s space on the ground floor is reserved for guests. This shows that the principal of generosity is still applied in contemporary architecture. Nonetheless, privacy is more stringently applied, especially with the existence of both the domestic worker inside the dwelling and the driver outside. The driver’s room is allocated with an external entrance and is totally segregated from the whole system. On the other hand, the domestic worker’s room is allocated far from the master bedroom, and integrated with related spaces such as the kitchen, laundry, and bedroom.
risk of fire from the kitchen however it would be better if the entrance for domestic worker was designed from the children playing room.

In general, such villas are suitable for a large wealthy family, but the majority of Al-Madinah households lack funds, or are too small to reside in such a large dwelling. A policy that determines plots in neighbourhoods’ plans should be built to one design to fit all is wasteful and might increase costs on a wider scale, as will be shown in subsequent chapters.

Figure 7.25: Plan of both ground and first floors for a typical villa with average size of plot

Private sections are set deep for more privacy and guest rooms are allocated near the entrance and segregated from the whole system of spaces, except for the kitchen for serving the dining rooms. Circulation spaces are too large. Such a dwelling may fit large and wealthy households, but not the majority of Al-Madinah residents.
7.8 Conclusion

A home in Islam is not only a space for living but also for praying to God. It is a holy place used for quiet residency, security, family life, reception of guests, and providing privacy. These requirements shape the quality of dwelling that a Muslim family may seek. Such Islamic principles are still applied in contemporary dwellings even if their form has been transformed. Because such principles are related to beliefs, they are sustained with regard to its morphologies, as those shown above in the space syntax diagrams. Such contemporary dwellings do provide private needs and Islamic requirements, except in terms of neighbour's rights and avoiding causing noise for both upper and lower neighbours in multi storey buildings.

It has been shown above that apartment dwellings are not of the highest quality for residents to live in. Apartment dwellings are not extendable, lack open space for children to play in, lack accessibility to play areas and grounds, lack easy control for watching and taking care of young children while playing in high rise buildings, and there are risks of falling on stairs and lift accidents. Yet, they are rented by residents as temporary dwellings with the hope that they will be able to afford their own dwelling that matches their needs and requirements with a quality of design and which is extendable for extending family or as an investment.

On the other hand, villa dwellings are seen as very wasteful in terms of building codes (measurements) and consumption of land, money and infrastructure. Large plots lead owners to extend room space and segregate usage, such as with a guest room, dining room, and toilet for each gender and age groups. The existence of a domestic worker in the house leads to the inclusion of a private toilet in the master bedroom for more privacy for parents as she/he will be considered a stranger (not Mahram) who lives in the house. Moreover, an extra bedroom is needed with its own toilet for her/him. Nonetheless, another extra bedroom with its own toilet may be needed for a family's private driver if the family leaders both work. In this case this room should be outside the dwelling and far from the harem. In a villa, this might be extended for extra rooms, but not all residents can afford a villa to own or even let. Meanwhile, in apartments, this is not possible because it is not extendable nor allowed for tenants.

Both apartments and villas are not adequate for residents' needs and demands. Though the design accommodates the need for separation of rooms from adjacent dwellings for privacy and to provide light, this is not required in the case of inner apartments. The
type of dwelling that is most frequent from overlapping the gamma diagrams is a
dwelling unit with two guest rooms with their own toilets, which are segregated from
the private section. The private section includes three bedrooms with at least two toilets
and a depth of seven spaces until reach to the most private one which is the master
bedroom.

The dwelling is shaped similarly to a house for any extension requirements and easy
accessibility to play areas for children, such as either the backyard or neighbourhood
court or hoash. The roof area is needed as an open private area for females, which is
lacking in apartment dwellings. However, the size of such a dwelling should be
calculated based on measurements of residents’ satisfaction with each space within the
dwelling. This is demonstrated in the next chapter.
Chapter Eight: Unit and Quantity: Size of actual dwellings and satisfaction

"If you desire many things, many things will seem few."

(Benjamin Franklin)
8.1 Introduction

The previous chapter shows the varying quality of types of dwellings in Al-Madinah. This chapter shows more detail and researches more deeply into the quantity of dwellings or types. It is about the size of dwellings with regard to the social and economic references of Al-Madinah's households. As shown before in chapter one, Arabs space consumption is very wasteful (Hall 1966). Saudi's consumption with regard to space has been criticised (Al-Fozan 1993) and such problems lead to what he called fat in houses, districts, and cities. The transformation of consumption is as Angel (2000) states 'from need to greed'. In Al-Madinah urban land is very limited as it is located between mountains, or farm lands. Yet, sooner or later urban land will be very rare to find if current policies and building measurements are still applied in the coming decade. In short as Hall states,

'Unless man can learn to pull together and to regulate his own consumption (and production) pattern, he is headed to disaster'.

(Hall 1977)

If a household's consumption of space within a private dwelling is managed then the urban land of the whole city can be managed for a better future.

This chapter shows how the quantities of Al-Madinah dwellings, that is the basic units that form the neighbourhoods and then the city, will affect the cost for both the public and government. It is the most important issue in how people think in terms of the size of their own dwellings. Moreover, it shows how wasteful are the measurements applied in Al-Madinah houses and how the same might apply in other Saudi cities. The central planning system and its generalized measurements only enable the rich class, which is a minority, to build their own houses and to build more and more as an investment, while the middle and poor classes still live as tenants or in poor neighbourhood and housing conditions. Most of these classes live as tenants to satisfy their needs regarding their household's size and socially to show or mimic a higher class in terms of the luxury afforded in the apartments or dwellings they reside in. In general, resident’s customs and planning authorities’ regulations led to this increase in housing measurements, high costs of building and infrastructure networking. The resulting size of residential units is too great in size and costs. Figure 8.1 below shows an example of an apartment, a dwelling of one storey. It has three bedrooms, two guest rooms, dining room, living room, kitchen, and four toilets. Wasteful measurements are
very clearly shown not only in utility areas between rooms, but also outside the dwelling in set back from all sides which creates useless spaces. This example of design wastes spaces only to satisfy building regulations which say a building should cover 60% of the total area of the plot, and set back should be three metres from fronts and two from other sides. The resulting design of the dwelling is very wasteful; at least 60 m² can be saved by reviewing the design and keeping all areas of rooms and toilets the same as they are. Of course this adjustment of measurements can save a lot of space and reduce costs as will be shown at the end of this chapter.

![Figure 8.1: Wasteful measurements of apartment dwelling's quantity of spaces](image)

Total built area is 340 m² within a plot of 525 m². Wasted and useless spaces are those shown in shaded with m² (yellow in color plan, and light grey in black and white), at least 60 m² can be saved with same areas for rooms and all spaces.

This chapter aims to show the results of average measurements of actual types of dwelling units. Averages such as mean and median of each area of use of a dwelling have been considered as the satisfactory size of use for a kitchen, toilet, guestroom, living room, bedroom and utility area. The sum of all will be considered as the actual
average size of dwellings to be considered before subdividing any neighbourhood plan. Thus, the actual size of a dwelling unit will be considered in the next chapter for purposes of land subdivision for plots that should be considered as a suitable size that fits the majority of Al-Madinah residents and their socio economic characteristics. This chapter shows the various different types and sizes of households in Al-Madinah and an analysis of sizes and satisfaction of the residents with each part of their dwelling units. It is not only guidance for developers for coping with the demands of the majority in Al-Madinah, but it is also an enabler policy for citizens to own dwellings to satisfy their needs and that are within their resources.

8.2 Habitable Area

A **habitable room** is defined as:

>'any room within a dwelling used or adapted to be used for the purpose of living, sleeping, or the eating or cooking of food and includes lounge rooms, family rooms, dining rooms, rumpus rooms, bedrooms, kitchens, but does not include bathrooms, laundries, garages, or garden sheds'


Thus, **Habitable Area** can be defined as the sum area of habitable rooms which are used as a separate dwelling within the whole dwelling, but still a part of a flat, villa or traditional house. In the case of Al-Madinah’s dwellings, the habitable area will be all the rooms in a dwelling except toilets, laundries, store rooms, garages, corridors and elevator room. All habitable rooms will then affect the size of dwelling. As shown in both figure 8.3 and table 8.1 below, the relationship between habitable areas and the dwelling is a linear one, especially when the dwelling’s area, which shown in figure 8.2, is less than 350 m². With a mean of 172 m² per dwelling the habitable area ranges between a minimum of 64 m² and a maximum of 494 m². The mean is about 28.6 m² per capita and moving between 10.6 m²/ capita as minimum and 82.3 m²/ capita as maximum.
Habitable area for two apartments in one floor. They are almost symetric. Both are two bedrooms dwellings. Total of built area is 252 m², and habitable area is about 180 m², which is about 71%. Other area which is uninhabitable area is about 71 m² and 29% of total built area.

BR = Bedroom
LR = Living room
GR = Guest room
K = Kitchen
T = Toilet

Both dwellings have single guests rooms and two toilets.

Figure 8.2: Habitable and inhabitable areas and the role of habitable area compared to total built area of the dwelling

Because the habitable area is most of the dwelling area the relationship is almost linear. An increase in such area is because a transformation of open multi-activity space occurs from outdoors to indoors in the form of a living room. Thus, it is important to analyse any such room and the other rooms in more detail and check the relationship with the total size of the dwelling. These spaces of rooms differ in regard to the size of a household, the number of rooms, class of the household and the type of dwelling unit. Yet, it is better to analyse more deeply the sizes of rooms and their number within a dwelling that affect the habitable area and consequently the size of the dwelling as a whole. Habitable rooms therefore, are the factor most affecting the size of dwellings.

Table 8.1: Percentage of Habitable area to total size of dwelling area

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Habitble area</th>
<th>Habitble area %</th>
<th>Dwelling Unit area</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>48</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Mean</td>
<td>172.2</td>
<td>75.8</td>
<td>229.1</td>
</tr>
<tr>
<td>Median</td>
<td>159.8</td>
<td>77.2</td>
<td>196.8</td>
</tr>
<tr>
<td>Mode</td>
<td>64</td>
<td>49.7</td>
<td>90.9</td>
</tr>
<tr>
<td>Minimum</td>
<td>64</td>
<td>49.7</td>
<td>90.9</td>
</tr>
<tr>
<td>Maximum</td>
<td>494.1</td>
<td>92.7</td>
<td>618.7</td>
</tr>
</tbody>
</table>
Habitable area then should be shown with its component parts to show the maximum wasteful consumption of space within the dwellings as detailed below and shows where the maximum consumption of space is.

Figure 8.3: Linear relationship between habitable area and dwelling area

8.2.1 Area of Living Room or Lounge

The living room in Al-Madinah dwellings is one that is used for sitting, relaxing, the family, lounging, meeting, watching television, and for dining in most cases. Traditionally, most dwellings in Al-Madinah were row houses, with no courtyard, but with a living room which was a main component of the house (as shown before in chapter five and quoted by Burton (1964), and King (1998)). On the other hand, houses in other Saudi cities were houses with courtyards in which most activities were done (Akbar 1980). Thus, a living room in Al-Madinah dwellings was full of activities for females, but only partially used for activities for males that used to be done within the Hoash (as mentioned before in chapter five). Moreover in contemporary Al-Madinah, not all dwellings have a dining room even if the area of the kitchen is big enough to occupy a dining table. It is because the custom of dining is mostly done on the floor in
the living room. It is the space most shared by members of the household within the dwelling. In dwellings which have only one guest-room, living rooms may be used for females when there are guests of both sexes. It is also a play-ground for children under six years especially in apartment dwellings. It can be used as a reception room for those who are much closer or relatives of households. It is very common in Al-Madinah to have very plain rooms with very simple furniture and a TV unit, to satisfy the need for a large multi use area. Of course, large living rooms are only found in super deluxe apartments or villas. This differs between types of dwellings as shown below in table 8.2.

- **In apartments**, living rooms have a mean area of 21.82m², ranging between a minimum of 5 m², and maximum of 60 m². Mode value is 24m². Mean value for area of living room /capita is about 4 m².

- In houses, size of living rooms differs between 7.5 m² and 30m² with a mean of 17.62m². But averages size move between 16m² and 18m² (mean median and mode values). Mean of living room area per capita is about 3 m².

- In villas, living room sizes vary between 15.75 to 84m², with a mean of 30m². The mean of living room area per capita here is about 5 m².

In general, the living room is the largest room within a dwelling in the samples as shown in figure 8.2, because it is the most usable space. However living room sometimes has a distinction of circulation with a private section and guest section as shown in a previous chapter. The mode of 24 m² is the most common in both apartments and villa dwellings because it is the minimum satisfied size.

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Flat m²</th>
<th>m²/capita</th>
<th>House m²</th>
<th>m²/capita</th>
<th>Villa m²</th>
<th>m²/capita</th>
<th>General m²</th>
<th>m²/capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>21.8</td>
<td>4.4</td>
<td>19.6</td>
<td>3.1</td>
<td>30</td>
<td>5.1</td>
<td>23.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Median</td>
<td>20</td>
<td>4.0</td>
<td>20</td>
<td>2.9</td>
<td>24</td>
<td>3.5</td>
<td>24</td>
<td>3.6</td>
</tr>
<tr>
<td>Mode</td>
<td>24</td>
<td>4.0</td>
<td>20</td>
<td>3.5</td>
<td>24</td>
<td>2.7</td>
<td>24</td>
<td>5.0</td>
</tr>
<tr>
<td>Minimum</td>
<td>5</td>
<td>0.0</td>
<td>7.5</td>
<td>0.8</td>
<td>15.8</td>
<td>2</td>
<td>5</td>
<td>0.0</td>
</tr>
<tr>
<td>Maximum</td>
<td>60</td>
<td>24</td>
<td>30</td>
<td>5.3</td>
<td>84.0</td>
<td>18</td>
<td>84</td>
<td>24</td>
</tr>
</tbody>
</table>

The maximum living room area is 84m² found in a villa dwelling of course this reflects the wealth and size of households those who live in such dwellings. The lowest maximum area of living rooms was in flats. In general, the largest areas are almost all in villa dwellings. The mode value in general is 24m². With regard to the size of living rooms, apartments and houses together form up to 80% of total dwellings, which means...
that the majority need an average area of living room between 16 and 24 m². Nevertheless, mean in villas is 30m², which is an increase of 20% in the area of the living room. Yet, measurements applied in villas are almost all wasteful ones.

8.2.2 Satisfaction to Quantity of living room

The tables and figures below show that the satisfaction of residents regarding area of living room is positive. About 70% of total samples are fairly or very satisfied about the size of living room they have. The highest satisfaction rate 84% is in villa dwellings, but the majority live in apartments. On average it is valued at four or fairly satisfied as shown in the tables below. On the other hand, only about 16% are either dissatisfied or very dissatisfied.

Table 8.3: Satisfaction to Area of Living Room within Types of Dwellings (%)

<table>
<thead>
<tr>
<th>Satisfaction</th>
<th>Value</th>
<th>Flat %</th>
<th>House %</th>
<th>Villa %</th>
<th>General %</th>
</tr>
</thead>
<tbody>
<tr>
<td>V. dissatisfied</td>
<td>1</td>
<td>2.7</td>
<td>0</td>
<td>0</td>
<td>1.9</td>
</tr>
<tr>
<td>F. dissatisfied</td>
<td>2</td>
<td>13</td>
<td>24</td>
<td>7</td>
<td>12.7</td>
</tr>
<tr>
<td>Neutral</td>
<td>3</td>
<td>14.6</td>
<td>20</td>
<td>8.8</td>
<td>13.9</td>
</tr>
<tr>
<td>F. satisfied</td>
<td>4</td>
<td>38.9</td>
<td>44</td>
<td>47.4</td>
<td>41.2</td>
</tr>
<tr>
<td>V. satisfied</td>
<td>5</td>
<td>30.8</td>
<td>12</td>
<td>36.8</td>
<td>30.3</td>
</tr>
</tbody>
</table>

Most of those who live in Villas are owners. This means that they bought or built their dwellings with regarding to their own satisfaction. Thus they have the highest rate of satisfaction of the other two types of dwellings. On the other hand, satisfaction among flat or house dwellers appear as hopes and dreams for tenants. Nonetheless, most residents of villas are in the high income group which are a minority to be considered. Thus, satisfaction of villa owners should not be considered for future planning of house measurements and standards. In fact, regarding the aim of this research to reduce wasteful standards and measurements, the lowest average measure, which is 20m², can be considered as a minimum standard area for living rooms in Al-Madinah’s future dwellings. At the same time, this area should not exceed more than 24 m². This minimum is possible only if courtyards are included within plots or neighbourhoods have playgrounds around plots for children’s play, otherwise living rooms should be considered as the highest average size of 24 m² with 4m²/capita. As shown in Table 8.3, the area of living room /capita in a villa is less than in apartments. Villas at least have space either around the dwelling, behind or beside the dwelling, or within a Cul-de-Sac, houses have a roof area as open space for playing, but apartments lack such courtyards or open spaces for children’ activities. Therefore, unless the type of dwelling preferred
is an apartment, living rooms should be kept as large as at present 24 m². Yet, area of living room is considerably satisfied as multi functions space of the family’s’ daily life. Though, adjustment of such space will allow decreasing wasteful areas of total habitable area, and consequently total dwelling area.

8.2.3 Area of Guest room

The guest room is a reception area allocated mostly for formal invitation events. The guest room is the space for hosting activities. Large dwellings which are very wasteful with space always have large guest rooms as shown in Figure 8.1. In large dwellings in Al-Madinah, the guest room is always coupled with a dining room. In most dwellings, the guest room is furnished with either Arabic or western sofas for guests. Arabic sofas are always against walls thus no wasted area within the room will be left. Moreover, they occupy more guests. But mimicry of modern life styles is practiced by the poor and middle classes in terms of furnishing so the majority have western sofas even sometimes locally manufactured for affordable prices. Guest rooms always need two complete sets of sofas such as are used in guest rooms in the UK for example (one chair, two and three seats sofas as shown in the figure below; but not all guest rooms in the UK can contain a complete set).

Figure 8.4: Double sets of sofas in case of Al-Madinah to fill in the space of standard guest room of the average size of 4m X 6m.
But in Al-Madinah, guest rooms often have two sets of sofas with chairs. Moreover, all pieces are set at least half a metre from the walls which waste areas behind sofas and chairs as these spaces are not used. Arabic sofas (Majlis) are set back to the walls and therefore more space is left in the middle for more activities such as dining. But in western dining rooms it is compulsory the sofas to be nearby each others, and used to have tea table in between. Yet, there will be no enough space for any activities such as playing dining, and though there was need for dining room near to kitchen.

In Al-Madinah in general, the guest room has an average of 24 m² (values of median and mode). They reach a maximum of 88 m², especially in villas. The average value is often greater in apartment dwellings, where the mean value is equal to 24 m², but has a maximum of about 52 m². On the other hand, a guest room's average area in villas ranges between 24 m², and 32 m². But, as shown in figure 8.4, an area of 24 m² which is satisfactory to most people is still a reasonably large area. It is occupied two sets of sofas.

The smallest area of guest room is in house dwellings. The mean is 22 m², with 2 m² less for mode, and 2 m² more for median. Moreover, from building permit samples the average of guest rooms is almost the same. Mean and median are about 26 m². The mode is about 24 m², which is the most frequent average value is 24 m². Yet, it should be the measure that would be considered as the minimum standard for guest room area for mid and low income groups. The table below shows these figures clearly. But, satisfaction ratios should be referred to before setting any standard area for guest rooms is determined.

Table 8.4: Statistics of size and number of guest rooms within dwelling’s types

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Flat m²</th>
<th>House m²</th>
<th>Villa m²</th>
<th>General m²</th>
<th>No of guest rooms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>24.3</td>
<td>23.5</td>
<td>32.6</td>
<td>26.1</td>
<td>1.7</td>
</tr>
<tr>
<td>Median</td>
<td>24</td>
<td>24</td>
<td>28</td>
<td>24</td>
<td>2</td>
</tr>
<tr>
<td>Mode</td>
<td>24</td>
<td>20</td>
<td>24</td>
<td>24</td>
<td>2</td>
</tr>
<tr>
<td>Minimum</td>
<td>12</td>
<td>12</td>
<td>18</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>Maximum</td>
<td>52</td>
<td>35.0</td>
<td>88</td>
<td>88</td>
<td>4</td>
</tr>
</tbody>
</table>

8.2.4 Satisfaction with area and number of guest rooms

Satisfaction in regard to size of guest rooms is almost positive. In general, and especially in apartments, about four fifths are satisfied as shown in table 8.5. But, in villas only one tenth is the percentage of those who are dissatisfied. On the other hand, in houses about 70% are satisfied. Moreover, satisfaction with the number of guest
rooms in most dwellings is almost positive whereas about three quarters are generally (and specifically in apartments) are positively satisfied.

The trend for numbers of guest rooms in other types of dwellings is the same as in size of guest rooms as shown in table 8.5. With regard to the samples of permits of the years between 1999 and 2004, about 50% have two guest rooms’ one for both genders. Only 4% had three guestrooms, and the rest have only one. The range of area lies between 14 m² and 39 m² with a mode of 24 m² as shown in table 8.5 & 8.6 are merged. Satisfaction is almost positive regarding the area of guest rooms, and consequently, a size of 24 m² or above is satisfactory to residents as a minimum standard guest room area with two guest rooms per dwelling. The wasteful consumption of space here is about one sixth more in villas than in apartment dwellings. Yet more positive satisfaction in villas doesn’t mean that area would be considered as standards because villas are minorities and the most common satisfied size of those who are the majority of low and middle income groups.

Table 8.5: Satisfaction to area and number of guest rooms within dwelling types

<table>
<thead>
<tr>
<th>Satisfaction</th>
<th>Flat %</th>
<th>House %</th>
<th>Villa %</th>
<th>General %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfied with number of Guest rooms</td>
<td>75</td>
<td>66.7</td>
<td>84.3</td>
<td>76.4</td>
</tr>
<tr>
<td>Satisfied with guest room area</td>
<td>79.8</td>
<td>71.4</td>
<td>90.4</td>
<td>81.4</td>
</tr>
</tbody>
</table>

8.2.5 Area of Kitchen

The kitchen is an appointed cooking room within a dwelling. In Al-Madinah’s traditional dwellings it was a plain room with a skylight as shown in previous chapters. It was half the area of a living room. In contemporary dwellings, kitchens have increased in size because of the modern appliances and traditional way of cooking and hosting. People in Al-Madinah and in Saudi Arabia in general are used to cooking rice with lamb in large pots as a main course when hosting events. Part of the hospitality requires large dishes for 4-6 men to share and some times boys too. It is the same for females. Each dish is about 70cm in diameter. At least two or three dishes would be laid out for each gender at any gathering. When preparing and putting food in such dishes, they are put on the ground at the same time to be filled with rice and meat inside the kitchen and to be taken hot to the guest dining room.

The area should be large enough to allow such activity in these events. Thus, the current kitchen area varies between 1.5 m² and 42 m² with mean of 15.4 m², median of 13.5 m²,
and mode of 12 m² (which is most frequent) as shown in table 8.7. Average size of kitchen areas seems to be half of the living room area. About 60% of the totals are between 10-20 m². Only in large kitchens a dining room includes a dining table, but others dining is on ground in living room. In wasteful kitchens they are more than 30 m² and placed near to both a separate dining and guest room as shown in the previous chapter.

Table 8.6 and 8.7: Statistics of Kitchen’s area in types of dwellings, and its sizes

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Flat</th>
<th>House</th>
<th>Villa</th>
<th>General</th>
<th>K. No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>15.2</td>
<td>11.3</td>
<td>18</td>
<td>15.4</td>
<td>1</td>
</tr>
<tr>
<td>Median</td>
<td>14</td>
<td>12</td>
<td>16</td>
<td>13.5</td>
<td>1</td>
</tr>
<tr>
<td>Mode</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>Minimum</td>
<td>1.5</td>
<td>3</td>
<td>6</td>
<td>1.5</td>
<td>1</td>
</tr>
<tr>
<td>Maximum</td>
<td>42</td>
<td>24</td>
<td>35</td>
<td>42</td>
<td>3</td>
</tr>
</tbody>
</table>

(S = Small, Av = Average, L = Large, and SL = Super large)

In other small kitchens, the area is big enough only for cupboards and appliances, such as the cooker, oven, fridge, freezer, sink, and sometimes a washing machine. Small kitchens include only cupboard units, a sink and cooker, which are the basic components. Fridges are always kept outside in such cases. Washing machines are also found in toilet rooms in apartments, but in a laundry room in cases of villas, either on the top floor or the ground floor located near a domestic worker’s room. To decide the adequate standard area of kitchen for those under the intermediate income groups, it is essential to examine the satisfaction of householders with the area of the kitchen. In data sourced from building permit samples, kitchen mean size is about 19 m². Both median and mode are less than mean value as shown in table 8.23 in appendix 8.

8.2.6 Satisfaction with size of Kitchen

More than 60% of those interviewed were satisfied with the area of kitchen they have, but only a quarter were dissatisfied, as shown below in table 8.8. The majority of 81% have either small or medium kitchens. They are still satisfied. In general in all types of dwellings more than two thirds are satisfied. The maximum satisfaction, which is about three quarters, is of dwellers in villas. But only about two thirds of those who dwell in apartments or houses are satisfied.
Table 8.8: Satisfaction’s levels regarding Kitchen Area

<table>
<thead>
<tr>
<th>Satisfaction Level</th>
<th>Flat %</th>
<th>House %</th>
<th>Villa %</th>
<th>General %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissatisfied</td>
<td>33.1</td>
<td>33.3</td>
<td>24</td>
<td>31.2</td>
</tr>
<tr>
<td>Satisfied</td>
<td>66.9</td>
<td>66.7</td>
<td>76</td>
<td>68.8</td>
</tr>
</tbody>
</table>

Yet, and as the most common area of kitchen among all types of dwellings is 12 m² (the mode value), it could be said that: a kitchen with a mean area of 12 m² will be the minimum standard size of kitchen for future Al-Madinah dwellings for those earning less than SR10,000 but should not exceed 20 m² as this size is shown mostly in villas and super deluxe apartments measures which are considered as wasteful sizes. Yet and for more flexibility, kitchen sizes are allowable between the means of both small (S) and average sizes (Av) for future dwellings within plots which will be adjusted in terms of these minimum standards measurements.

8.2.7 Bedrooms

A bedroom is an enclosed area used for sleeping. Beds are not always used in Al-Madinah dwellings. People may sleep on only cotton or sponge mattresses. So, a room may have plenty of spaces for sleepers, as mattresses are smaller than beds in area and after waking they can be folded away and rooms can be used for other things. Akbar (1998) shows how this fits into Saudi bedrooms. But, as Saudis behaviour in terms of consumption of space become more desires. Though, contemporary bedrooms in Al-Madinah seem large for only two or three people and to be used only for sleeping. In general, these bedrooms appear smaller than other rooms within dwellings as shown in Figures 8.1 and 8.2. But they still affect size of habitable area and the dwellings’ as well.

The size of bedroom does not differ that much between modern apartments and villas, but does between modern and traditional dwellings in the same manner as the total area of the dwelling.

In general, the bedroom area varies between 10 m² and 42 m². Averages are almost about 20 m². Maximum areas of bedroom are found in villas and the minimum in houses. Average measurements are almost the same in both apartments and villas. In houses the averages are smaller. Table 8.9 shows this clearly. Large bedrooms are exceptions, but these averages compared to other countries as said before are considered...
to be very large ones. Regarding to data sourced from building permit samples, both mean and median values are 20 m² for bedrooms and the mode is a bit smaller.

Table 8.9: Statistics of bedroom's area among types of dwellings

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Flat m²</th>
<th>House m²</th>
<th>Villa m²</th>
<th>General m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>19.2</td>
<td>15.9</td>
<td>23.6</td>
<td>19.8</td>
</tr>
<tr>
<td>Median</td>
<td>20</td>
<td>16</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Mode</td>
<td>20</td>
<td>16</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Minimum</td>
<td>10.5</td>
<td>10</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>Maximum</td>
<td>35</td>
<td>24</td>
<td>42</td>
<td>42</td>
</tr>
</tbody>
</table>

Source: Field survey and manipulated by author in SPSS

To set standard bedroom area should be classified into two types, the main or master bedroom and other bedrooms. Master bedrooms may be adequate at 20 m² to accommodate an extra cot for an infant and an area for a private toilet for more privacy especially for couples, unless domestic workers do not live in such future dwellings. Other bedrooms should not exceed 16 m² to avoid wasting space and increasing size of dwelling, and include a private toilet so there is segregation between members of the household as mentioned in a previous chapter. Satisfaction of householders with this arrangement should be considered before this occurs.

Table 8.10: Number of bedrooms among types of dwellings

<table>
<thead>
<tr>
<th>No of bedrooms</th>
<th>Flat %</th>
<th>House %</th>
<th>Villa %</th>
<th>General %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9.6</td>
<td>15.0</td>
<td>2.3</td>
<td>8.5</td>
</tr>
<tr>
<td>2</td>
<td>50.7</td>
<td>20.0</td>
<td>4.7</td>
<td>37.7</td>
</tr>
<tr>
<td>3</td>
<td>28.7</td>
<td>45.0</td>
<td>53.5</td>
<td>35.7</td>
</tr>
<tr>
<td>4</td>
<td>9.6</td>
<td>5.0</td>
<td>20.9</td>
<td>11.6</td>
</tr>
<tr>
<td>5</td>
<td>1.5</td>
<td>15.0</td>
<td>9.3</td>
<td>4.5</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>2.3</td>
<td>.5</td>
<td>.5</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>7.0</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Field survey and manipulated by author in SPSS

The Number of bedrooms as shown in table 8.11 is mostly between 2 and 3 bedrooms per dwelling. In general, more than two thirds of apartments have either two or three bedrooms but it is less than this in both houses and villas. Both apartments and houses include a maximum of five bedrooms but villas include up to seven bedrooms maximum. The highest percentage to include single bedrooms is in houses where the living room is a multi-function room which can be used as a bedroom at night. Even in data from permit samples, the number of bedrooms is usually between 2 and 3 per

1 In regard to what Hall 1966 said that American feels lost in Arabian room spaces, 154-164
dwellings. Because of size of household in Al-Madinah is 6, the standard number of bedrooms should be between two and does not exceed three in future dwellings but it should be extendable for future needs and requirements and types of dwellings would be allocated a specific number.

8.2.8 Satisfaction in general in average sizes of rooms as habitable area

Dwellers of Al-Madinah in general are satisfied with rooms’ average sizes among types of dwellings. Only less than one fifth of the total are dissatisfied. The highest ratio of satisfaction to size of rooms is in villas which are regarded as having wasteful measurements. In contrast, the lowest satisfaction is in houses. Yet, measurements of rooms applied to apartments reflect the need and requirements of the householders, and which are implemented not by the Municipality but by developers who have the studied demands of their client’s tenants for the number of rooms per apartment. On the other hand, those living in villas may exceed areas to avoid losing some areas of his/her plot that he/she paid for. However, the above measurements of habitable rooms are almost satisfactory as shown in table 8.11. They will be considered in the calculation of actual sizes of dwellings in Al-Madinah at the end of the chapter.

Table 8.11: Satisfaction with average size of rooms

<table>
<thead>
<tr>
<th>Satisfaction Level</th>
<th>Flat %</th>
<th>House %</th>
<th>Villa %</th>
<th>General %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissatisfied</td>
<td>18.2</td>
<td>42.9</td>
<td>7.4</td>
<td>17.9</td>
</tr>
<tr>
<td>Satisfied</td>
<td>81.8</td>
<td>57.1</td>
<td>92.6</td>
<td>82.1</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Field survey and manipulated by author in SPSS

Habitable areas are the most dominant section within the dwelling as shown earlier, having average measurements in total which have mean about 20 m²/capita and range between 16 and 23 m²/capita. With regard to the mean (but not the maximum of habitable area), villas waste habitable area in comparison to apartments with 73% of area (\[
\frac{(181.64 - 105.06)}{105.06} \times 100,\]
and with 106% in regard to the value of the mode. Yet, measurements of villas are very wasteful regarding habitable area. Moreover, data from permit samples shows evidence that the mean of habitable area per capita is about 28.6 m², which is more than the mean of the data from the questionnaires at 43%. This is because most of the permit data is for permits granted in the five years from the date of the field work. Nevertheless, most developers or landlords built such dwellings either for their private villas, or as an investment in super deluxe apartments.
either in high rise or two storey buildings. In both cases the same wasteful building regulations are applied. On the other hand, the questionnaire data includes traditional houses, old villas and apartments with very tiny measurements compared to the current wasteful ones. So the habitable area will be considered as 20 m² capita which lies between the general median value and the apartment's value which should reflect the actual need, not greed.

Table 8.12: Statistics of habitable area within types of dwellings and area/capita

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Flat m²</th>
<th>m² / Capita</th>
<th>House m²</th>
<th>Villa m²</th>
<th>General m²</th>
<th>Area m² / Capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>105.1</td>
<td>22.6</td>
<td>117.1</td>
<td>181.6</td>
<td>122.5</td>
<td>23.3</td>
</tr>
<tr>
<td>Median</td>
<td>99.4</td>
<td>20.3</td>
<td>116</td>
<td>160</td>
<td>112</td>
<td>19.4</td>
</tr>
<tr>
<td>Mode</td>
<td>64</td>
<td>22</td>
<td>150</td>
<td>132</td>
<td>132</td>
<td>16</td>
</tr>
<tr>
<td>Minimum</td>
<td>16</td>
<td>3.4</td>
<td>40</td>
<td>78</td>
<td>16</td>
<td>3.4</td>
</tr>
<tr>
<td>Maximum</td>
<td>300</td>
<td>179.7</td>
<td>191.5</td>
<td>341</td>
<td>341</td>
<td>179</td>
</tr>
</tbody>
</table>

Source: Field survey and manipulated by author in SPSS

Nonetheless, habitable areas should not be considered as the total area of the dwelling, but non-habitable areas should also be viewed and examined as to its ratio within dwellings as below.

8.3 Non-habitable area

This is the sum area of toilets and all spaces not included above in the habitable area. It includes laundries, store rooms, garages, corridors and elevator rooms. Not all of Al-Madinah dwellings have all these rooms, but all have toilets and corridors which are not included in questionnaires. Toilet areas will be calculated from a sample of the questionnaires. The rest are extracted from samples of building permits sourced from the Municipality archives to calculate ratios of such utility areas per dwelling. Then finally the quantity or actual sizes of dwellings, mostly apartments for rent, but not as dwellings for ownership, will be calculated.

8.3.1 Area and number of Bathrooms and Toilets

Toilet is always an un-habitable area and yet it is traditionally kept outside habitable section as shown in previous chapter. Thus, traditional dwellings had toilets outside the habitable rooms, and are always kept under stairs or nearby. Moreover, even in other cultures such as British's one, Dr. Ahmed Kaki (owner of real estate agent 'A.A.K. Properties' in Newcastle upon Tyne and bee in UK since 1980's and working on real
A toilet is always a part of the bathroom. The bathroom is a place for dressing and cleaning the body (brainy dictionary 2001). It usually contains a shower and a basin and toilet. In Al-Madinah, in traditional dwellings, the toilet used to be a plain area under the stairs or around this area because septic tanks were used at that time. It usually contained a tank with a jug for washing. In later ones there is a shower on the wall, a tube tap for washing, a toilet unit, and splash unit as shown in the figure below. Basins used to be out of the toilet room in a private section to be used for bath, allowing use of the toilet by others. The direction of the face or back while seated in the toilet should not be in the direction of Makkah (Akbar 1980).

Modern bathrooms, especially in the guest section, have become showrooms of cleaning products, towels, mats, mirrors, luxury taps, curtains, marble floors and ceramic walls. As they are larger in area, and have more contents, consequently they cost more. Despite the large areas which are wasted in bathrooms, more than one is common in most Al-Madinah dwellings, even in one bedroom dwellings. From survey data, bathrooms look like those below in figure 8.4.
Table 8.13: Statistics of toilets within types of dwellings

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Flat m²</th>
<th>House m²</th>
<th>Villa m²</th>
<th>General m²</th>
<th>Area m² / Capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.7</td>
<td>3.8</td>
<td>5</td>
<td>4.7</td>
<td>3.7</td>
</tr>
<tr>
<td>Median</td>
<td>4.3</td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
<td>2.5</td>
</tr>
<tr>
<td>Mode</td>
<td>6.0</td>
<td>4.0</td>
<td>4.0</td>
<td>6.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Minimum</td>
<td>1.2</td>
<td>1.4</td>
<td>2.0</td>
<td>1.2</td>
<td>0.6</td>
</tr>
<tr>
<td>Maximum</td>
<td>12</td>
<td>6.0</td>
<td>10.5</td>
<td>12</td>
<td>17.5</td>
</tr>
</tbody>
</table>

Source: Field survey and manipulated by author in SPSS

In general, sizes of bathrooms in dwellings are a minimum of 1.2 m², and maximum which is about ten times that (12 m²). Mean and median are 4.69, and 4.0 m² respectively. The smallest mean is in houses with 3.8 m². But, in villa and apartment dwellings the mean is almost the same. Average area of bathrooms is 4 m², which is the value of both median and mode in both villa and house dwellings. Moreover, it is the median value of general statistics of dwellings as shown in the table below. Maximum area of bathrooms is in apartment dwellings but this is only in two cases which might be due to an incorrect estimation of questionnaires. Yet, even maximum in villa dwellings is about 10.5 m² which is still a wasteful measure with regard to size of bathrooms. On the other hand, permit samples show that variance between mean, median, minimum, and maximum area of bathrooms is narrower. Mean and median are 4.82, and 4.85 m², which are almost the same and not far from those results of the field survey. However minimum and maximum are 2.73, and 7.0 m², which are closer than those from the field survey.

The average size of bathroom considered as a popular size is 4 m². The maximum should not exceed 6 m² for future dwellings, and the minimum should not be less than 2 m². This size is considered enough area for bath, toilets, cupboards, and a changing room. Nevertheless, survey data include villas, which have very large areas of toilets, which have increased the average area. The great significance in this research is that in both data sources (questionnaires and samples of permits), means of bathrooms are very close.

In term of number of toilets per dwelling, the maximum number is the same from both sources of data but the minimum differs. It is one from survey data and two in permit samples. Median is 3 toilets/ dwelling in both, but modes and means are slightly different. Nevertheless, the average value of both median and mode is 3 toilets per dwelling. Though, in survey data, the majority have either two or three toilets per dwelling, over 40% have three toilets, and about 35% have two. Each of the rest (less...
than 10%) have either 1, 4, 5, 6, or 7 toilets per dwelling. The majority of dwellings from the permit samples have 2, 4, and 3 toilets respectively. Only about 12.5% have 5, 6, or 7 toilets per dwelling. A large number of toilets is expected in Villa dwellings and super deluxe apartments.

![Modern Toilet (Western), used in current dwellings and full of accessories, rugs, lights, curtains, marble floor, and ceramic walls](image)

**Figure 8.6:** Contents of Modern toilet and its furniture, size of toilet is about 6 m\(^2\) (2m x 3m)

Nevertheless, domestic workers living in homes created a need for an extra toilet, in addition to a private one for the master bedroom. These numbers (5, 6, &7) seem higher than average.

On the other hand, area per capita is high. Area changes between minimum of 0.25 m\(^2\)/capita, and maximum of 12 m\(^2\)/capita. Mean and median are over 2 m\(^2\), but the mode is 3 m\(^2\)/capita. Area per capita here is not applicable because a toilet is a space for single use and not a shared space the same as habitable spaces.
Table 8.14: Number of toilets within types of dwellings

<table>
<thead>
<tr>
<th>No of bathrooms</th>
<th>Flat %</th>
<th>House %</th>
<th>Villa %</th>
<th>General %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6.5</td>
<td>5</td>
<td>9.3</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>41.7</td>
<td>45</td>
<td>48.8</td>
<td>42.6</td>
</tr>
<tr>
<td>3</td>
<td>43.2</td>
<td>25</td>
<td>4.7</td>
<td>6.4</td>
</tr>
<tr>
<td>4</td>
<td>1.4</td>
<td>5</td>
<td>20.9</td>
<td>5.9</td>
</tr>
<tr>
<td>5</td>
<td>0.7</td>
<td>10</td>
<td>9.3</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td>0.7</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Field survey and manipulated by author in SPSS

Satisfaction levels with the number of toilets within dwellings show most are satisfied. The preferable number of toilets is about four. Thus, it can be considered that the number for groups who earn a monthly income less than SR 10,000 should be 4 toilets, as they the majority of the Al-Madinah residents and especially in the case of extended families or a large family. Because of Islamic culture and separation between girls and boys, there should be 2 toilets for children. A private one for the master bedroom is also required. Finally in case of a live-in domestic worker or a guest there should be an extra toilet. Therefore, two, three or four seem adequate numbers of toilets for such group dwellings. Of course, small dwellings such as those with one bedroom should not have more than one bathroom.

Table 8.15: Satisfaction to number of toilets within types of dwellings

<table>
<thead>
<tr>
<th>Satisfaction Level</th>
<th>Flat %</th>
<th>House %</th>
<th>Villa %</th>
<th>General %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissatisfied</td>
<td>18.4</td>
<td>33.3</td>
<td>12.7</td>
<td>31.2</td>
</tr>
<tr>
<td>Satisfied</td>
<td>74.6</td>
<td>66.7</td>
<td>87.3</td>
<td>68.8</td>
</tr>
</tbody>
</table>

Source: Field survey and manipulated by author in SPSS

In terms of toilet area, most privacy should be given to females ones. Therefore the master toilet should be in the master bedroom separated by a utility area or clothes storage area. This one should have the largest area. Small areas should be allocated for children and domestic worker’s use. A guest toilet should be enough for a shower, and two toilets, an Arabic one and a modern one, which is more comfortable for elderly people, and washing sinks. A washing room always used to be attached to a children’s toilet or attached to the domestic worker’s toilet. It is better to avoid attaching it to female toilets. Though two small toilets of about 3m² each are adequate for children and domestic workers, a washing room of 4m² should be attached to the boys or
domestic worker’s toilet. Guest toilets should not exceed more than 5m². A master toilet may be given 8m² including its utility area. Thus, total area would be 19 m² for three or 23 m² for four toilets.

8.3.2 Area and ratio of corridors and distributors within dwellings

As mentioned in chapter three, the area of corridors and distributors between rooms were not included in questionnaire data. Though the actual size of a dwelling can not be calculated only from areas of rooms, the triangulation of sourcing data from permit samples is the way to get such measurements as shown below in table 8.16. The ratio of corridors and distributors from permit samples are considered as the ratio in questionnaires to calculate the actual size of dwellings. As shown in table 8.16 and figure 8.5, the average size of a utility area is between 50 and 60 m², and percentage to total dwelling’s area is between 22 and 24%. Neither maximum nor minimum should be considered in future calculations to avoid being wasteful or creating too small an area. The utility area should be considered to be minimum acceptable or satisfied areas. In this study and from results of data sourced from permit samples, and satisfaction levels of dwellings sizes, the percentage of corridors area should not exceed 23% of dwelling area to be added to the toilet area and habitable area to get the actual total size of dwellings in Al-Madinah. Architects should try to reduce such areas as much as possible unless it is well used for internal landscaping and decorating. At the same time, corridors should be wide enough for furniture accessibility.

Table 8.16: Statistics of utility area, extra use, and actual size of dwelling with percentages

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Utility Area (Paths, stairs, etc)</th>
<th>Utility area % Other Use</th>
<th>Other Extra Use Area cm²</th>
<th>Total Actual size of dwelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid N</td>
<td>48</td>
<td>48</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Missing</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mean</td>
<td>57</td>
<td>23.4</td>
<td>0</td>
<td>7.17</td>
</tr>
<tr>
<td>Median</td>
<td>49.4</td>
<td>20.9</td>
<td>.00</td>
<td>197.9</td>
</tr>
<tr>
<td>Mode</td>
<td>61.5</td>
<td>8.1</td>
<td>.00</td>
<td>101.3</td>
</tr>
<tr>
<td>Minimum</td>
<td>11.6</td>
<td>8.1</td>
<td>.00</td>
<td>101.3</td>
</tr>
<tr>
<td>Maximum</td>
<td>212.8</td>
<td>48.5</td>
<td>64.3</td>
<td>635.8</td>
</tr>
</tbody>
</table>

Sourced from permits samples from Municipality’s archive and manipulated by author using SPSS
Sometimes, designers' waste space outside when it would be better used for internal spaces of rooms. Such wasted areas should be used for habitable areas of rooms as shown in Figure 8.6. Instead of wasteful two sky lights, the eastern one is cancelled and the living room and guest room became larger. On the other hand, the western light well is decreased and the kitchen is enlarged. However, wasteful areas can be used for outdoor leisure such as play areas or side courtyards as shown below in Figure 8.6 where there is still a larger kitchen and living room with an outdoor yard as a play area. Moreover, set back from sides can be cancelled and then the use of light wells can save some areas. Alternatives for extending or saving wasteful measurements as shown below are endless, and alteration of the design is the responsibility of designers, dwellers—if they are the owners—, and the Department of Building Permits in Al-Madinah Municipality to review designs before approving such wasteful design in terms of measurements in un-habitable areas.
8.4 Actual Size of dwelling needed “Actual Demand”

The actual size of Al-Madinah dwellings is the sum of both habitable and non-habitable areas. In data sourced from permit samples, 76% of the total samples do not have an extra use within their dwellings than those listed above. Only the above usages of habitable and non-habitable areas would be considered by the majority of residents. In the table below are shown variations between actual sizes of dwellings in types of dwellings. But because utility areas are about 23% of the total size of dwellings as shown above, it can be calculated in the field data as follows:

\[ X = 77\% \quad Y = 23\% \]

\[ X = \text{Total size of dwelling} \]
\[ Y = \text{Size of utility area} \]

Then, \[ Y = \frac{23}{77} X \quad \text{or} \quad Y = 0.2987 X \]

Table 8.17: Utility area and percentage to total dwellings’ area

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Utility Area m² (Paths, stairs, corridors, distributors, etc)</th>
<th>Utility area Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>57</td>
<td>24.2</td>
</tr>
<tr>
<td>Median</td>
<td>49.4</td>
<td>22.9</td>
</tr>
<tr>
<td>Mode</td>
<td>61.5</td>
<td>7.3</td>
</tr>
<tr>
<td>Minimum</td>
<td>11.6</td>
<td>7.3</td>
</tr>
<tr>
<td>Maximum</td>
<td>212.8</td>
<td>50.3</td>
</tr>
</tbody>
</table>

Sourced from permits samples from Municipality’s archive and manipulated by author using SPSS
Table 8.18: actual sizes of dwellings among types of dwelling and in general

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Flat m²</th>
<th>House m²</th>
<th>Villa m²</th>
<th>General m²</th>
<th>Area m² / Capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>182.9</td>
<td>183.5</td>
<td>294.6</td>
<td>208.9</td>
<td>40.9</td>
</tr>
<tr>
<td>Median</td>
<td>168.5</td>
<td>172.4</td>
<td>270.8</td>
<td>192.2</td>
<td>33.6</td>
</tr>
<tr>
<td>Mode</td>
<td>110.4</td>
<td>98.7</td>
<td>202.6</td>
<td>202.6</td>
<td>22.1</td>
</tr>
<tr>
<td>Minimum</td>
<td>70.1</td>
<td>95.2</td>
<td>127.3</td>
<td>70.1</td>
<td>8.6</td>
</tr>
<tr>
<td>Maximum</td>
<td>483.1</td>
<td>322.1</td>
<td>564.9</td>
<td>564.9</td>
<td>418.2</td>
</tr>
</tbody>
</table>

Sourced from permits samples from questionnaires and manipulated and calculated by author using SPSS

In general, average size of dwelling areas varies between 192 and 209 m². But in villas, it is very wasteful and lies between 202-294 m². On the other hand, apartment and house dwellings seem almost the same regarding the mean of actual areas, but apartment’s dwellings are larger in terms of median and mode. The smallest dwelling is about 70 m² in apartment dwelling. In general mean dwelling area per capita is about 41 m². By the way, the apartment’s measurements should be considered as an actual determinant for the size of future dwellings but not those tremendously big villas which are more than 61% to 83% bigger than most apartments’ areas. Yet, apartment’s measurements which are almost the same as those of traditional house dwellings reflect the sustained measurements for local and traditional sizes of dwelling. Yet the actual mean sizes of apartment suits the majority of Al-Madinah residents.

More than four fifths of dwellers are satisfied about the size of dwellings they reside in, which are mostly apartments. Apartments’ measurements are more adequate for residents of Al-Madinah but not as the type of dwelling shown in the previous chapter.

Figure 8.9: Satisfaction with actual size of dwelling
The actual need or demand for dwellings is almost satisfied as follows:

- **Living room mean area** required to satisfy the majority of residents is shown to be about 24 m², but may be larger in case of apartments that are no more than 30 m²

- **Guest rooms mean areas** seem adequate at about 24 m², and more if an extra one for females can be afforded. In such cases, extra guest rooms can have multiple uses. For example, a female guest room can be used as a night living room if it is located near a bedroom or in a private section as traditional houses were, and a dining room can be used as day living room if it is located close to a kitchen and avoids it being used only occasionally.

- **The average kitchen area** starts from the mean of 15.6 m² but should not exceed 20 m² or more for one kitchen unless another new extended family and new dwelling is needed

- **Bedroom area** seems in the majority of cases to be around 16 m² for children’s rooms and 20 m² for the master. In total three bedrooms is the maximum for a dwelling unless a domestic worker, extended relatives, or private driver is included within the household. In each case the location of the bedroom should be regarded

- **The popular toilet area** seems to be about 4 m² in general and 6 m² in the main one for the master bedroom. The number of toilets should not exceed 3 unless extra bedrooms or dwelling-space is needed as shown above

- **There should preferably be two entrances** for a dwelling for gender consideration, but there should not be more than one if there is another access for the back yard

- **A courtyard is missed by most people, especially those who live in apartments and houses** and in some villas the wasted spaces are only in the form of set back from all sides. Yet a courtyard should be considered as the main space for a dwelling to afford safe and easy access for young children away from car circulation.

- **Roof areas should be open for future extension** as the majority of homes lack such features in current dwellings
• Set back from sides should be avoided, but there should be a compulsory back one to afford a safe courtyard and play area for daily use rather than wasting space at the sides. Front set back should be optional to provide more change in frontages of buildings and more freedom in presenting the frontage of each dwelling with regard to dwellers otherwise it should be used for private garages for dwellers where it is most lacking as shown in chapter 6

• Privacy will be satisfied when separation of guest sections from private one by floors occurs as in traditional houses

• Extension of dwellings is lacking in most dwellings especially apartments, yet the apartment is not the preferred house type which would be the best alternative for extension in future either when adding some members (relative, domestic worker, or private driver), or a new extended family such as a newly married son or daughter

8.5 Conclusion:

Neighbourhood planning policies and building regulations for insides of dwellings are centrally set in wasteful measurements as stated in chapter one. It is shown in the above evidence how wasteful measurements are applied in Al-Madinah building regulations. Such, measurements in policies and building regulations would not enable the majority of residents to develop their own dwellings and so they mostly live as tenants. On the other hand, the rich classes and developers are the only people capable of building such plots and buildings within the present regulations. Moreover, developers as professionals those who aim to make revenues have altered these wasteful measurements to fit within Al-Madinah’s residential socio-economic characteristics in terms of the quantity and quality of dwellings, excepting most apartments. Actual dwelling size or quantity is quite reasonable for most household’s needs. Indeed the type of apartment’s dwelling is the most one that to be approved as minimum standard measurements those are satisfied. Because it reflects the actual size that fits with the household’s socio-economic characteristics even if the quality of the apartment is not the best quality to fulfil the households expectations as shown in the previous chapter. Planners should regard such measurements during subdivision of land for residential lots or plots for the majority who earn less than SR 10,000. This would enable them to buy a plot and then develop it and perhaps later extend it for the next
Chapter Eight: The Quantity of Dwelling Unit and Actual Size and Satisfaction

generation. Wasteful measurements should be revised by the municipality and especially by designers who apply such measurements without concern about total cost. Landlords will then not waste spaces or areas around the building or within it in the form of non-habitable or useless areas.

The main significance is that the resulted mean size of dwelling is almost the same as the one from traditional dwelling shown in previous chapter. Yet, size of dwellings is sustained by the cultural role that affect dwellers and sizing their dwellings, and by the role of demand and supply between dwellers and developers and despite the generalized wasteful measures. Nevertheless, it is cultural values which affect the consumption of space within a dwelling even if policies and regulations are wasteful. Wasteful consumption of space within dwellings in terms of the mimicry of design and furnishing both increase costs of a dwelling that could be owned rather than rented. Moreover, satisfaction is high regarding the current size of dwellings that households reside in.

The actual size of the dwelling is the most dominant consideration that should be taken into account when subdivision of plots occurs. Yet, current policies and regulation of plot size which are considered during the land subdivision for neighbourhood planning should be reviewed and adjusted as will be shown in the next chapter.
Chapter Nine: De-Fragmentation of space: ‘Adjustment’ of the dwelling within the neo-neighbourhood and the neighbourhood within the city

“Always design a thing by considering it in its next larger context - a chair in a room, a room in a house, a house in an environment, an environment in a city plan.”

(Elieh Saarinen)
9.1 Introduction:

The previous chapter shows that dwelling size is sustained from traditional dwellings to modern ones despite the wasteful measures that are applied. Dwelling types have been transformed from houses to either apartments or villas which are either satisfying to their residents or seem unaffordable for those earning SR 10,000 or less as shown in the previous two chapters.

This chapter examines the results gained from chapter seven and eight according to the regulation of building codes that satisfy the majority of residents. Regarding to between the quality, according to the type of dwelling (chapter 7), which is concluded should be a house, and quantity (chapter 8), for example a three bedroom dwelling with a total area of 210 m², such measures will be applied in the design of dwelling units to satisfy the building codes. The dwelling is examined in regard to its affordability including all the costs and compared with current prices of three types of dwelling shown in chapter seven. Then, it applies the proposed two sizes of dwelling in the current plot sizes of either three or five dwellings depending on the size of the plot and how such dwellings form a neighbourhood unit when de-fragmented. Set back from all sides, single courtyards and a shared open space as in ‘Hoash’, plus basic amenities such as a local mosque, nursery, play areas and play grounds are considered.

9.2 Plot size needed for average dwelling size “adjustment”

A plot is defined in Arabic as “a piece of land or ground” which can be the same as ‘a lot’ that means a portion of ground. It means here any piece of land used for the purpose of dwelling. In general it is defined as follows:

‘A small extent of ground; a plot; as, a garden plot’
‘A plantation laid out’ or
‘A plan or draught of a field, farm, estate, etc., drawn to a scale’ (Brainy Media 2001)

As shown in chapters 7 & 8 that type of dwelling should be a house, but not apartment dwelling which lack accessibility for playing areas and playgrounds, nor a villa which is very wasteful in consumption of space. Moreover, both apartment’s and villa’s buildings are set back from all sides, but in houses this does not occur. Plots should not be considered under such wasteful policies or regulations that waste 40% of the plot.
area and value in set back and unusable spaces. However, set back may be applied only from the front if that allows a parking area off the streets. Nevertheless, a small open space may be allowed for a private garden or play area for young children to allow for categorising the space from a purely private courtyard, to a semi-private area 'Hoash' in the back yard space, shared by a cluster of dwellings as proposed before in chapter five.

Regarding the questionnaire data, average size of plots are widely spread in land subdivision in Al-Madinah’s new planned areas as shown below in table 9.1. Plot size in informal areas varies between 64 to 560 m² with a mean of about 300 m². But in planned areas information from questionnaires and permit samples shows it is about 600 m² which is double the size of informal areas. Planned area plots vary between 340 and 1550 m². The minimum is about three times and the maximum is more than six times the plot area in informal areas. In planned areas where questionnaires were issued and permits sampled, plots smaller than 400 m² are very rare. The ministry can approve plans if one or two plots are smaller than the minimum area. Despite aiming to reduce area or plots here, such examples of small plots in new approved plans show how designers or planners subdivide the land for plots but cannot even manage to adjust the plots with regard to minimum areas as stated in the policies for subdivisions from the Ministry of Municipal Affairs. As the mean size of dwellings is about 208 m² in general and 183 m² in apartments which are the majority, the mean size for dwellings should be considered between 200 m² as total surface area and 100 m² as ground area. Moreover, permit examples show that the mean of dwelling size is larger than discovered by the questionnaires but only by about 10%. Reducing dwelling size more is better for those who do not apply for permits and do not have plots.

Table 9.1: Statistics for size of current plots in both informal and planned areas

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Informal</th>
<th>Planned</th>
<th>General</th>
<th>Planned areas (Permit's 50 samples)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
<td>20</td>
<td>106</td>
<td>126</td>
<td>46</td>
</tr>
<tr>
<td><strong>%</strong></td>
<td>15.9</td>
<td>84.1</td>
<td>100</td>
<td>92</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>299.7</td>
<td>636.6</td>
<td>585.4</td>
<td>655</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td>300</td>
<td>600</td>
<td>562</td>
<td>600.4</td>
</tr>
<tr>
<td><strong>Mode</strong></td>
<td>300</td>
<td>400</td>
<td>400</td>
<td>650</td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>64</td>
<td>372</td>
<td>64</td>
<td>340</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>560</td>
<td>1550</td>
<td>1550</td>
<td>1359.4</td>
</tr>
</tbody>
</table>

Data sourced from both questionnaires and permits samples and manipulated by author

Although dwelling size in informal areas reflects the organic growth of human settlements as shown in chapter two they are commonly small areas of plots and in
average area of 100 m². Consideration here should be a bit different. Traffic routes split human movements within the city districts and so planners should consider when subdividing land the lack of play grounds for young children within plots, and play grounds for older children within neighbourhoods as shown before in chapters five and six. Moreover, informal area homes are mostly on one floor, so a dwelling with two storeys should not be the same 300 m², to save space for play areas and back yards. Nonetheless, funds should support such dwellings and enhance conditions of life within such informal areas.

Designers should prove the opposite of what Philip Johnson states about wasting spaces. 'Architecture is the art of how to waste space' (Brainy Media 2001), but to reduce wasted space and enable to increase useable ones such as back yards and courts between cluster of building to form neighbourhood unit. Architecture should be the art of how to arrange spaces within a smaller plot with more useful spaces, and make them more adequate for interaction between the houses and residents of the local area. Consequently, urban planning should also be how to adjust exact measures to fit resident's socio-economic characteristics and satisfactions, regarding the plots they can own and build upon and open spaces around or between them for their leisure use and other social life.

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Flat m²</th>
<th>House m²</th>
<th>Villa m²</th>
<th>General m²</th>
<th>Permit's samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dwelling</td>
<td>182.9</td>
<td>183.5</td>
<td>294.6</td>
<td>208.9</td>
<td>229.1</td>
</tr>
<tr>
<td>Minimum area</td>
<td>70.1</td>
<td>95.2</td>
<td>127.3</td>
<td>70.1</td>
<td>90.9</td>
</tr>
<tr>
<td>Maximum area</td>
<td>483.1</td>
<td>322.1</td>
<td>564.9</td>
<td>564.9</td>
<td>618.7</td>
</tr>
</tbody>
</table>

Plot size should then be adjusted from current policy which is stated in chapter four it should be at minimum 400 m². Also plot size should be reduced to fit with the socio-economic characteristics of Al-Madinah residents. Adjustment would be from the lower limit of 400 m² to an area that would be affordable for ownership and building within affordable resources. Moreover if it is considered that the type of dwelling would be preferable as a house type, then no set back area should be considered for plots during the land subdivision. Small courtyards in back plots may be required for young children as mentioned in chapters 6, 7 & 8. Therefore this area, which should not be more than 5 m², a car garage in the front with an area of 15 m² and a small area for vegetation in a back yard with an area of 10 m² should be in total no more than 50 m².
To start to rearrange spaces to meet specifications set in a previous chapter, with the addition of the missing specifications as shown above, the dwelling would be similar to the one shown below in Figure 9.1. Plot area should be greater than the sum of all those spaces. Moreover, the type of dwelling should be the ‘house’ as a separate, extendable dwelling but should not be detached. Total dwelling area for both ground and first floor is about 209 m², which is almost the same area that is in general the size of the dwelling shown in Table 9.2. However, it is not like those contemporary dwellings in terms of the benefits of front and back spaces in proposed ones are usable and extendable. Front set-back is allocated for the entrance of the house, for gates for garages, or instead a room for a private driver if one is needed in the household. Otherwise, an extra room for children’s guests, a room with an external door for male relatives, a room with an internal door for grand relatives and accessibility to the whole dwelling for all members of the household as social life used to occur in Al-Madinah society.

All areas of rooms are adjusted as in the previous chapter. The ground floor is allocated for the guest section, and the first floor is for the private section. Guests in such dwellings always take the right side to enter the guest section reception room or dining room, and will take the left when leaving as happened in a traditional house as shown before in chapter six. Both rooms have natural lights from the front for the guest room and from the back for the dining room. Only one toilet will be allocated on the ground floor for guests or grand relatives use. The kitchen is on the same floor for serving the guests and residents when dining or using the dining room as a day living room benefiting from access to the back yard garden. Furthermore, the kitchen has access to the back yard and the area there is wide enough to extend one small single room for a domestic (female) worker.

The private section is on the first floor with access from stairs that are lit by the light well. Two children’s bedrooms with their own toilet are on the left of the stairs. On the right is the master bedroom with its en-suite toilet. In between is the living room, the largest space within the dwelling. Privacy is upheld for both female children and domestic workers in terms of views from windows. Separation is applied to both the household and others within the dwelling. Moreover, the first and second floors can be extended not only into the front by half metre, but one metre on both front and back sides. This will allow for more shade on the ground floor for car parking on the front and for the back yard seating area.
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The roof area is accessible from the stairs and potentially extendable for an extra room and toilet for young single boys, or a complete one bedroom dwelling in case of a related new family such as a married son or daughter. Of course in this case this dwelling has its own guest room, or in the case of sharing the same guest room on the ground floor, then an extra bedroom for children is available. Extendibility is the most positive factor in a house when residents can own it at affordable prices. Such a dwelling only needs half the plot of the minimum size allowed in current policy for neighbourhood plans (400 m²).

Figure 9.1: Proposed neo-traditional house with no set back from sides.

The dwelling has three bedrooms, dining room, kitchen, living room, three toilets, and back yard garden. It is extendable to a room for private driver, friend of male children, or male relative in front set back and area of garage. Also, it is extendable for another room for domestic worker in the back yard and accessible from kitchen. Moreover, it is extendable for a small dwelling within the roof area with one bedroom, living room, kitchen, guest room and two toilets if there is a separate guest room from the main one. Otherwise, the two dwellings share the guest room on the ground floor.
The dwelling has the same number of spaces but with larger living room, and extra utility areas. An extra toilet can be added under the stair area if the dwelling is extended with an extra room for an elderly relative, office use, or library. A toilet can be added under stairs by increasing the height of stair’s first section and benefits from the light well area for lighting and ventilation as shown.

However in larger current plots, which are over 600 m² and even in those over 1000 m², more than two dwellings are expected to be adequate within one plot. Even more, at least three of the large proposed dwellings such as shown below can be included in one average plot of contemporary plot sizes. It means plots may be 731 m², which is shown in table 9.3 below, three sub-plots of width of 12 m, and depth of 20 m. Each sub-plot contains a larger dwelling in terms of a hallway and either one large room or one separated into two rooms; one for guests and the other for a private door where the corridor is about 2.4m wide. Extra rooms for relatives are mentioned above or for office use instead of garages and a driver’s room.

An extra toilet can be added underneath the stairs to use space and not waste it as shown below in Figure 9.3. Corridors became wider in both floors for better movements of a large family within a four bedroom house. The fourth bedroom is likely to be on the roof. Furthermore, there is a super large living room as the family is larger. Extension here is based on the size of the household that lives in the house and not only because...
policies and regulations state and control such measures. Such designs in both standard and large dwellings shown here are only examples of how spaces can be rearranged to form up (design) a dwelling that fulfils the satisfaction of Al-Madinah residents and provides them with what they lack in current dwellings. Moreover, extension should be developed incrementally with the growth of the household.

Figure 9.3: Toilet under stairs with outer washing sink, and skylight for lighting stairs, and toilet

9.3 Neo-traditional House and space configuration

Quantitative issues applied above in terms of proposed dwellings fit with residents’ needs and requirements in regard to their socio-economic characteristics. The qualitative issue is to allocate the type of dwelling and space configuration within its design. As shown before in chapter seven the most satisfactory type is not an apartment, because they lack play areas and playgrounds, privacy and extendibility. On the other hand, an informal dwelling such as a courtyard house is not the type that suits Al-Madinah residents because they are not the traditional house that relates to the culture. Moreover, it does not suit the present form of dwelling where air-conditioning and a central courtyard is most required in modern dwellings. Yet, an inner courtyard will cost a lot and this goes against the goal of the research and defragmentation approach. However, a house is similar to a villa in terms of a private entrance,
extendibility, roof area, a back yard and any development can not affect neighbours homes. However, houses are better than villas as they are compact, low cost in terms of plot price, isolation and construction: they have a safe and secure back yard and have a common space to share with neighbours for all activities and events, which is similar to traditional houses, or a 'neo-traditional house'.

By drawing up the gamma diagram for a dwelling as shown in figure 9.4, and adding the extension plan, it can be seen that the only loop is between the guest room, dining room and space for the toilet, kitchen and stairs upward from the ground floor. Segregation is applied in terms of the extra room that may be used by male relatives, young males, or as an office for the head of the household. For use by a private driver, the entrance should be directed out into the front yard and not open inside the house. Segregation and satisfaction of privacy is applied on different floors, where the family or the private section is allocated on the first floor. All living rooms, toilets, two bedrooms and the lobby of the master bedroom are connected to the main lobby on the first floor. The master bedroom has its own lobby that segregates it from the main lobby ensuring its own privacy, especially in the case of visitors or a domestic worker.

The future extension, in its maximum capacity, is allocated a separate level of privacy too when it is either to be used by a new small family such as a newly married son or daughter. The extension is the same as the first floor in distribution of space but the use is different. There is one bedroom with its own private toilet; a living room; a guest room; a toilet and kitchen. The guest room can be used as another bedroom in the case of sharing the same guest room with the main family. In general, the total number of spaces is 24, and depth is 7 including extensions and five without. It is almost the same number of spaces for the traditional plan shown in chapter 7 minus the roof spaces, and the same depth. The distribution is different in terms of addition of private toilets to bedrooms, which is a need as stated before, but such a privacy issue was only raised after domestic workers started to be common in Saudi households. Such issues should be considered as a resident's necessity that may require to be changed over time.

Moreover, the loop between the guest room, dining room, toilet and kitchen is for integration of spaces in case of a party or dwellers’ daily life activities. The most depth occurs in the extension dwelling and especially its bedroom for a daughter in law to reside in and in case there are brothers of her husband, those who are not allowed to see her or to be as ‘Mahram’, if they are over 10 years old.
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Figure 9.4: Gamma diagram for proposed dwelling of a two storey house

It has with possibility of an extension of an extra room with its toilet, and a complete extra dwelling with one bedroom, kitchen, two toilets, living room, and guest room.

9.4 Plot prices for average size of dwelling “cut prices”

Construction costs for such a dwelling with consideration of 1,000 SR/M² will start from SR 209,000 for a standard dwelling and SR 237,000 for the larger one without any extra extension, and plot price is excluded. Yet plot price varies from one area to another and would lead to faster development and direction of growth. Table 9.3 shows that median value is about 625 m², which is the minimum area in the comprising scheme for those who have a limited income. Plots with a minimum area of 400 m² decreased the median to 621 m². Moreover, it is evident that those small plots are more popular in terms of building while large ones are left vacant as investments in case of an increase of price in the short or long term.
Price differs between patterns of districts that plots are in, and if affordable areas are serviced. Cost of land was not included in the questionnaire as mentioned before in chapter three. According to plot prices, the Al-Ghanim website, which is one of the most famous real estate agents in Al-Madinah, offers a good source for such issues. In the web list shown on October 2005, and within 272 vacant plots, prices start from SR 32,000 for a plot of 84 m² in informal areas, up to SR 3,000,000 for a palace plot with 4,322 m² in serviced new planned areas as shown above in the table. The mean price is SR 332,000 for a mean area of 731 m². The majority of plots are about 600 m². Such plots can take three attached houses as shown below. Each has its own front garage, yard, roof area and rear yard in case of separated yards or a shared one if all agree to have a larger open space as a 'Hoash'. The total ground built area is 294 m² which is about 49% of the plot's area. It does not exceed the ratio allowed which is about 60%. Moreover, even after extension for two rooms for domestic workers in the back yard and a private driver’s room, the ratio is still within 60%. On the other hand, such dwellings are extendable, with usable yards, and would be in affordable prices for ownership. Nevertheless, in the case of a shared open space as Hoash, this will offer a safe semi-private open space only for residents who surround the Hoash as will be shown below in the next sub-chapter.

Table 9.3: Statistics for 272 Vacant Plot’s selling price per m²

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Vacant plot area</th>
<th>selling price</th>
<th>Price of 1 m²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m²</td>
<td>X 1,000 SR</td>
<td>SR/m²</td>
</tr>
<tr>
<td>Mean</td>
<td>731</td>
<td>332</td>
<td>505</td>
</tr>
<tr>
<td>Median</td>
<td>621</td>
<td>220</td>
<td>324</td>
</tr>
<tr>
<td>Mode</td>
<td>600</td>
<td>150</td>
<td>500</td>
</tr>
<tr>
<td>Minimum</td>
<td>84</td>
<td>32</td>
<td>58</td>
</tr>
<tr>
<td>Maximum</td>
<td>4,322</td>
<td>3,000</td>
<td>5,208</td>
</tr>
</tbody>
</table>

Sourced from (http://www.alganim.com/page3.html.htm) for both eastern and western parts of Al-Madinah, and manipulated by author using SPSS

In general, plots cost about 505 SR/m². Therefore a plot of 200 metres is about SR 101,000, for a standard dwelling. On the other hand a larger plot will cost about SR 111,100. In spite of this, the final total cost of a dwelling will start from 310,000 SR. This cost can be reduced if plots are bought in informal areas, especially those which are ignored and vacant and near the city centre, or if it is a subdivided plot of 600 m² divide into three plots, especially those plots with a depth of 20 m as shown in Figure 9.5. This case is only applicable if the largest side of the plot is on the street.
In Shuran plans granted to the south of Al-Madinah are medium plots which have an area of 1100 m² with a 55m frontage on the street and a depth of 20m. Each of these plots may be occupied by five dwellings; three large ones and two standards as shown below. Such plots with wasteful measures can save money for developers, and provide easy ownership for those who are still tenants, who cannot get REDF loans, nor accept bank loans with interest. At the current large size, even fencing would be very expensive for owners. Yet developing these plots for five dwellings seems a good investment for the developer and good opportunities for buyers to have an affordable dwelling at reasonable prices. Such plots were sold in 2005 at a maximum of SR 250,000, which means that each plot is about SR 50,000. Consequently, total costs for a dwelling are reduced and start from SR 260,000. According to the real estate agent, Al-Ghanim, for prices in 2005, the proposed dwelling’s price is a quarter of the selling price for a villa, half the price of a house and less than an apartment price by between 13% to 31 %, and these apartments are sold only in the form of complete high rise buildings that lack courtyards, garages, and are not extendable. If compared with the price of a dwelling in the Housing Project that is sold for SR 500,000 plus REDF loan, which is about SR 250,000, then the proposed dwelling’s cost is reduced to almost one third.
Tables 9.4, 9.5, and 9.6 show how prices vary in each type of dwelling. All locations are in the central area of Al-Madinah and exclude such calculations as were made in the first chapter. Traditional houses' prices are between values modes and medians (SR 250,000-300,000) and are in very bad locations which lack services and utilities, lack courtyards, or are in bad condition regarding materials and finishing.

Table 9.4: Selling Price for villa in general in Al-Madinah

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Villa's plot area</th>
<th>villa's selling price x SR 1,000</th>
<th>Price of 1 m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>727.93</td>
<td>1,327</td>
<td>1823</td>
</tr>
<tr>
<td>Median</td>
<td>600</td>
<td>1,100</td>
<td>1833</td>
</tr>
<tr>
<td>Mode</td>
<td>400</td>
<td>1,200</td>
<td>3000</td>
</tr>
<tr>
<td>Minimum</td>
<td>210.</td>
<td>550</td>
<td></td>
</tr>
<tr>
<td>Maximum</td>
<td>4500</td>
<td>5,000</td>
<td></td>
</tr>
</tbody>
</table>

Sourced from [http://www.alizanim.com/page3.html.htm](http://www.alizanim.com/page3.html.htm), and manipulated by author

Table 9.5: Selling Price for traditional house in general in Al-Madinah

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Traditional house area m²</th>
<th>Selling price SR x SR 1,000</th>
<th>Price of 1 m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>399.22</td>
<td>512</td>
<td>1282</td>
</tr>
<tr>
<td>Median</td>
<td>297</td>
<td>290</td>
<td>785</td>
</tr>
<tr>
<td>Mode</td>
<td>400</td>
<td>250</td>
<td>625</td>
</tr>
<tr>
<td>Minimum</td>
<td>63</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Maximum</td>
<td>2500</td>
<td>3,000</td>
<td>240</td>
</tr>
</tbody>
</table>

Sourced from [http://www.alizanim.com/page3.html.htm](http://www.alizanim.com/page3.html.htm), and manipulated by author

Table 9.6: Selling price per meter and apartments dwelling

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Multi-storey buildings plot area</th>
<th>selling price SR x SR 1,000</th>
<th>Price of 1 m²</th>
<th>Price of flat X 1,000 SR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>417.67</td>
<td>1,957</td>
<td>5,453</td>
<td>375</td>
</tr>
<tr>
<td>Median</td>
<td>400</td>
<td>1,290</td>
<td>4,000</td>
<td>300</td>
</tr>
<tr>
<td>Mode</td>
<td>400</td>
<td>1,000</td>
<td>4000</td>
<td>300</td>
</tr>
<tr>
<td>Minimum</td>
<td>80</td>
<td>75</td>
<td>300</td>
<td>19</td>
</tr>
<tr>
<td>Maximum</td>
<td>2000</td>
<td>15,000</td>
<td>3,968</td>
<td>2,333</td>
</tr>
</tbody>
</table>

Sourced from [http://www.alizanim.com/page3.html.htm](http://www.alizanim.com/page3.html.htm) for both eastern and western parts of Al-Madinah, and manipulated by author using SPSS

The two small dwellings have plot areas of 200 m², and 210 m² built area for a two floor house. The mid-size dwelling has a plot of 220 m² area, and a 232 m² built area over two floors. The two semi-detached ones have the same areas of building plus an extra 20 m² in plot area as set back from the side, have no windows, and can be extended by building on the upper floor on those sides.
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Figure 9.6: At the top, one of the medium plots in the Shuran Plan in the south of Al-Madinah
The plot has an area of 1100 m² that can occupy five dwellings instead of one wasteful villa as proposed in Grants plan. At the bottom, another alternative where front set back can be adjusted in case of wide roads that provide on street parking for each dwelling, and larger rear yards as single ones or one shared as in a Hoash if the whole block is adjusted with the same measures of regulations.

Such set back is needed only when the rear back yards are opened up by all the neighbours together with the other row of dwellings to afford a larger open space for their local services such as a local mosque, nursery, common hall, and play grounds for children as in a 'Hoash'. On the other hand, set back from the front is only needed if streets are too narrow to have private car parking as shaded garages. Only if the street is wide enough to have diagonal on-street car parking should set back be optional in order to use such a piece of land in the rear for usable areas for children, elderly, events and seating areas as shown in figure 9.5. Such an alternative seems better in terms of total segregation from cars. Moreover, it allocates four parking spaces for each dwelling ‘House’ and space between for trees that offer shade for cars especially in

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summer and provides humidity that cools down the heat of the weather plus some privacy for entrances and windows of the dwellings from passers-by.

9.5 Total cost of dwelling and monthly payment per household
As shown before in chapter six the majority of Al-Madinah households (80% of total residents), earn less than SR 10,000. Such income groups are neglected by developers in terms of long term payments, and even banks apply high interest rates that people cannot pay. Applying such rates for the value of plot price and building at a ratio of 60% as stated in current building regulation 'codes', will result in a total of SR 864,000 to pay within 10 years with monthly installments of SR 7,200, or a total of SR 1,350,000 with monthly installments of SR 4,500. Both are still more than one third of monthly incomes. Nevertheless, the majority of residents do not prefer bank loans related to 'Ribba' or interest loans which are banned by Islam. There is now an Islamic loan with a constant interest rate, but they are more costly and still doubted by residents as any extra cost over what has been borrowed is considered as 'Ribba'. Examples of plots prices, building's costs and loan interest rates are as follows:

Plot price = SR 300,000 (services, and outside holy zone), SR 400,000 (inside and serviced), SR 200,000 (outside and serviced)
REDF loan queue is very long at about 11 years
Bank loans are with 6% interest loans for 10 Years
Cost of construction is SR 1,000/ 1m²
60 % built area of min plot area (400m²) = 240m²
Total built area over 2.25 storey allowed = 540m²
Total cost of construction min/dwelling = SR 540,000
10 years loan to pay = SR 864,000
Monthly payment = SR 7,200
25 years loan to pay = SR 1,350,000
Monthly payment = SR 4,500
Financial policies do not help people in such income groups to afford dwellings with the above plot sizes and building regulations. Compactness is urgently needed to cut costs of dwellings to produce places with manageable prices for middle and low income groups. Meanwhile the cost of 'neo-traditional house' or proposed dwelling starts from SR 260,000, which is less than the amount of an REDF loan. But in this regard,

1 Loan calculator Riyad Bank Website 2004
monthly payments will start from SR 2,167 and go up to SR 3,000 for ten years for Ministry of Housing loans (interest free the same as REDF loans), or with more to developers.

Yet, development of such dwellings saves 13.3% of REDF funds which can be given for others to benefit from. Moreover, there will be no need for land grants if dwellings were given interest free loans by REDF. Consequently, there will be more saving of land to be subdivided and granted. Part exchange for proposed dwellings may be accepted for applicants of REDF loans if they have vacant plots. Then, more vacant land can be returned for better directed and scheduled development. These proposals can reduce fragmenting of developments and fragmenting of efforts and funds for infrastructures.

### 9.6 De-fragmentation from set back and wasted spaces to a social open space or a shared yard or ‘Hoash’

Allocation of dwellings together should not be randomly aggregated, but with flexible policies and regulations with regard to the shared open space as shown in the concept of the ‘Hoash’ in chapter five. Such policies are not the same as those in Stein, Krier, and Duany’s development as shown before in chapter four, but the flexible ones of self incremental development which are not only cost based but also based on knowledge and cultural issues such as stated by (Hillier 2003).

Hillier allocates the logic of the ‘unit’ and where it will be allocated spatially. He argues that the order of unit takes place synchronically within the city or cluster by individuals in old cities. This should be specific for his case studies, because in Islamic cities, especially in Al-Madinah, dwellings were set and adjusted as shown before in chapters three, four, and five by Islamic law, especially when a neighbour wanted to develop a house. The rules and policies considered in that development paid regard to their neighbors. But when Hillier (2003) stated that on the upper level of individuals there is a co-operation, then this is what Islam brings to neighbourhood values and quality that residents seek from the location of their dwellings.

Hillier goes further to find out how the grid was created. Consequently he states how a city forms in exact aggregation of buildings to form a living city with a system of relations (Hillier 2003). But his main analyses are about routes of movements’ more than social relationships of neighbourhoods which are generated by the built environment. Yet he goes far from the main point of ‘Social Logic of Space’ to a
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‘Movement Logic’ one, which is abstracted from cultural issues to systemic ones that form the spatial arrangement and order of the city. None the less, Hillier illustrates in the figure shown below the spatial logical order of dwellings either as adjacent row houses or ‘terraces’, or the other choice to disperse randomly and fill spaces between dwellings with an unrecognisable pattern. He proposes that by allocating the next dwelling adjacently and geometrically, either a court or plaza can be formed then it completes itself. The next dwelling will be allocated in front of two dwellings to complete the other row houses and form up the two sides of the street or route (Hillier 2003).

![Diagram of dwellings allocation](image)

**Figure 9.7: Allocation and relations between dwellings and to the outer space.**
Adapted from Hillier (1996)

But after this when aggregates and clusters of dwellings on a higher level create neighbourhoods, towns or cities, Hillier states that more than the individual level:

"Higher order of co-ordinates that we can think of as a kind of synchronisation, since over and above consistency in the local rule which put the system together there is a clear ‘all at once’ quality to what we represent to ourselves at the level of the whole object." (Hillier 2003)

This is shown in chapters seven and eight, that the house is the most satisfactory quality of dwelling type, and shown above is the size and shape of dwellings proposed as a dwelling unit that satisfy the majority of Al-Madinah residents in terms of both quantity and quality. With regard to neighbourhood values stated in chapter five, and according
to traditional types of Al-Madinah houses, attached houses are the form that best fit with socioeconomic and cultural characteristics. Allocating dwellings has many options. Each one has its own configuration and relationship with others and the outside. As shown in the Figure above 9.7 A, and B as dwellings are allocated in different positions. The first position is that they are near by to each other but are separated and both have symmetric relationship with space C. Each one with its own plot and setback spaces is segregated by an abstract unusable space. In addition consumption of plot space is high. Developers claim that each villa has its own privacy, but in reality, some villa dwellers either do not use their courtyard because the neighbours can see them from their side windows or they construct barriers to avoid sight of the neighbours. This means than that they do not know their neighbors; otherwise that they trust them and know that they will not look if they are in the courtyard. Another result is greater costs for barriers and windows, curtains, double glazing and isolation.

But in the second position, where both A and B are attached together, both have symmetric relationship with outer space C, and also have an interrelationship Yet, they can be called neighbouring dwellings. Consumption of plot space is less in this case, and cost is less in terms of construction in the above issues. Adjacency of walls is a physical attachment that warms up social relations. Each neighbour then shares part of the buildings, chances to talk are greater in this case and such events will foster neighbourhood relationships. In such cases dwellings do not affect construction of others in terms of water leaks, noise of running steps, digging, nor limit future extensions. Both dwellings have access to outer space and to the sky in terms of horizontal extension.

In the third position, A and B have an interrelationship but do not have the symmetric outer relationship with C. Their interrelation seems a bit weaker than the previous case because of noise of running steps, water leaks and limitation of accessibility to the sky for the lower dwelling and to ground space for the upper one. In terms of cost this alternative seems the lowest, but not the appropriate one to satisfy Al-Madinah residents.

The de-fragmentation is to consider design of the original unit within its larger context as stated by Saarinen:

*Always design a thing by considering it in its next larger context - a chair in a room, a room in a house, a house in an environment, an environment in a city plan.* (Brainy Media 2001)
Building up a neighbourhood is to provide a safe freely accessed 'semi-private' environment that makes social life more active and a shared one rather than segregated ones. This would increase the simplicity of de-fragmentation of basic elements of the built environment with the bottom up model in a larger context as stated by Wright:

"Think simple as my old master used to say - meaning reduce the whole of its parts into the simplest terms, getting back to first principles". (Brainy Media 2001)
De-fragmentation of wasteful spaces to useful spaces is part of the planner's duties during the neighbourhood planning process. Children, elderly all other ages of resident and their needs should be regarded during this process and especially when subdividing space. Subdivision does not mean what has been misunderstood by most of those who only divide land into smaller saleable plots, but it is to allocate some open spaces for leisure, meetings, seating and participating in local and national events. On the other hand, it should not be modelled as an optimum and repeated everywhere or be a frequent pattern. Each courtyard and the dwellings around it should be a unique Hoash. The open space should be left for residents to create their own neighbourhood as they like as the space is semi-private. Yet, it would reflect their real identity, and consequently they feel that they belong to it. Foster states that:

"Control is the wrong word. The practice is very much about sharing, and, in any creative practice, some individuals, whether partners or directors, are much closer to certain projects than I could ever be" (Brainy Media 2001)

A real neighbourhood is where residents who are supposed to be neighbours will decide what they need to facilitate the Hoash area incrementally to their social and economic characteristics. For example, if they mostly have very young children then a nursery might to be a good use for a mosque in the morning or within a small building in the Hoash. But if they have older children, then a play area and playgrounds are essential for them. Moreover, seating areas are also needed for women and elderly people for evening times. As shown below, the area of a Hoash is enough for more activities such as a covered swimming pool or a community hall, especially for large events. Landscaping also should be left to the priorities of residents, to choose the types of trees, shrubs, sands and pavements in the Hoash to characterise their own identity and make a unique neighbourhood that differs from the others. This will enhance the responsibility of all the residents to save their own neighbourhood. This case will occur when the private sector develops a block as a neighbourhood within the Hoash concept, and the Hoash is a complete private tenure for residents or a private open space. But, if the land is for the government and intended for housing projects or upgrading of informal areas, then the area of Hoash should be allocated first as it will be a semi private area. Using the model in chapter five should be revised in this case and be tested. Then it can be said that the model for Madini neighbourhood land subdivision can be used for both vacant lands and informal areas as shown below.
City Planning: Collaborative process between neighbourhood planning teams, infrastructure agencies, and publics' participation to reduce costs of provision of infrastructure and other services after compactness both sizes of neighbourhoods, and dwellings within, with defragmentation process using urban information systems during planning processes.

District level of planning or land subdivision which is mostly been confused by planners and architects, who still consider this level as neighbourhood planning. At this level, the main services such as secondary schools, Friday mosques, sport & fitness clubs for youngsters, shopping centre, and clinic. Traffic should be controlled especially when intersects with pedestrians' walkways to services.

Neighbourhood unit is a cluster of dwellings around open semi-closed space for daily, children activities, and elderly seating. It includes court 'Hoash' local mosque, nursery, corner shop, and between 13 to 40 houses as traditional neighbourhoods were.

Dwelling unit is a neotraditional house that been optimised and adjusted from wasteful spaces and replaced with useable ones. It is extendable unit with private backyard, and access to a semi private court 'Hoash'.

Figure 9.9: Model of bottom up of city planning starting from the dwelling unit which is the primary cell of organs (neighbourhoods) and whole body (the city)

The design of dwelling is not very rigid or a fixed model, but it is only an example with satisfactory measures concluded from the questionnaires provided by Al-Madinah residents. Of course, households should have full freedom of design to be satisfactory with adjusted measures within the building’s ratio. Yet, some dwellings in the figure above are shown with private garages, or extra rooms and parking on the street.
9.7 Modelling the Madini Islamic Neighbourhood

As shown in previous chapters, both quality and quantity of dwelling indicate a house with a plot area of 200 m², is the most satisfactory for the size of a three bedroom house type of an extendable nature in any direction within the plot area. Moreover as shown in Chapter Five the equation below is to calculate the ‘y’ area of the courtyard between dwellings if the number of dwellings is known as ‘x’.

\[ Y = a \times X + b \]

\[ Y = 0.01 \times X + 14 \]

Y is Number of Houses in Hoash
X is Area of Hoash (court or open space)

\( a (\text{slope}) = 0.01 \), which was resulted by SPSS as \( .008485 \)

\( b (\text{Constant}) = 14 \), which is resulted by SPSS as \( 14.020285 \)

However in vacant land, both are unknown. Yet the model has to use some considerations of what was discovered from the field work, and what has been shown as the satisfactory size of dwelling unit. Moreover, dwelling size at that time was unknown. Yet with a consideration of the mean size of dwelling and the plot of 200 m², calculating the model in SPSS between the Hoash area and total areas of the surrounding dwellings, the model will be as below:

Figure 9.10: Small neighbourhood block with shared back yards as a Hoash

The facilities which should be decided by residents to have what they might require, with one corner shop and a small mosque, two gates—one as main for going out to shop and mosque, the second is for guests when parking, rubbish collection.
Chapter Nine: De-fragmentation of space in Al-Madinah dwellings within Hoash

Figure 9.11: Linear model of relationship between Hoash area and total areas of dwellings

The model will be a bit different from what has been shown before. It will be as follows:

\[ Y = \{(0.44) Z - 918\} \quad \text{(result will be in m}^2\text{ as it is an area of 'Hoash')} \]

Significance of the relation is high and the model is valid between ranges of a number of dwellings from 11 to 74.

'X' is the number of houses around the Hoash

'Z' is the total area of dwellings around the Hoash based on mean plot area of 200 m\(^2\) or \((200 \times X)\)

'Y' is the area of Hoash between dwellings or plots.

The table below shows results with ranges, but to gain 'Y', means of blocks 'Z' should be measured first in each pattern of subdivision.

The area of Hoash '', will be allocated for each block regarding its area and number of houses.

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Hoash Area m(^2)</th>
<th>Number of Houses</th>
<th>Total Area of Houses m(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid No</td>
<td>74</td>
<td>74</td>
<td>74</td>
</tr>
<tr>
<td>Mean</td>
<td>1,150.7</td>
<td>23.8</td>
<td>4,700</td>
</tr>
<tr>
<td>Median</td>
<td>607.5</td>
<td>20</td>
<td>4,000</td>
</tr>
<tr>
<td>Mode</td>
<td>400</td>
<td>14</td>
<td>2,800</td>
</tr>
<tr>
<td>Minimum</td>
<td>110</td>
<td>11</td>
<td>600</td>
</tr>
<tr>
<td>Maximum</td>
<td>4,738</td>
<td>74</td>
<td>14,800</td>
</tr>
</tbody>
</table>
9.8 Scenarios of Testing the Model

In general, the model was tested with calculations of Hoash areas within the number of surrounding houses based on the above formula with a range of numbers of dwellings as stated above. Table 9.8 shows that range of Hoash areas differs between intervals. But, the minimum area of Hoash per capita is 4.65 m², and the maximum is 12.3 m². It can be considered as 10.5 m² for each of the houses which number around 35-45 as in a traditional Hoash. This differs in each type of land use as shown in the following scenarios:

Table 9.8: Testing Hoash areas per range of dwelling and then per capita

<table>
<thead>
<tr>
<th>Number of Houses</th>
<th>Hoash Area</th>
<th>Mean of Hoash area</th>
<th>Mean size of population</th>
<th>Mean Hoash Area/Capita m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-20</td>
<td>50 - 842</td>
<td>446</td>
<td>96</td>
<td>4.65</td>
</tr>
<tr>
<td>21-30</td>
<td>930 - 1,722</td>
<td>1,322</td>
<td>156</td>
<td>8.47</td>
</tr>
<tr>
<td>31-40</td>
<td>1,810 - 2,602</td>
<td>2,206</td>
<td>216</td>
<td>10.21</td>
</tr>
<tr>
<td>41-50</td>
<td>2,690 - 3,482</td>
<td>3,086</td>
<td>276</td>
<td>11.18</td>
</tr>
<tr>
<td>51-60</td>
<td>3,570 - 4,362</td>
<td>3,966</td>
<td>336</td>
<td>11.80</td>
</tr>
<tr>
<td>61-74</td>
<td>4,450 - 5,594</td>
<td>5,022</td>
<td>406</td>
<td>12.30</td>
</tr>
</tbody>
</table>

9.8.1 Farm lands

Al-Madinah was traditionally formed of compact neighbourhoods separated by farms as stated before in chapters two and five. The map below in Figure 9.12 shows farm lands remaining in Al-Madinah. Farms seem to cover a large area but compared with urban land area, 304 farm lands consume only about 2% of the total area and should be reserved as rough farm land not to be subdivided for any reason and to create a green belt to surround the main urban areas. Figure 9.12 below shows farm land that is fragmented around Al-Madinah, but this is not noticeable in the base map in Figure 9.12. Farm lands have been eroded by subdivision into urban land as well as by vast subdivision of land. However parts of this rough and vacant land were neglected as they are expected to be subdivided in the near future. Such farm land should be sustained and not allowed for subdivision as they are mostly located within the holy zone from which it is prohibited to take plants.
Chapter Nine: De-fragmentation of space in Al-Madinah dwellings within Hoash

The rest which are not shown are considered as vacant rough lands but should sustained and not to be allowed for future subdivision. Source: digitised manually by author using ArcView 3.1, and ArcGIS regarding to aerial photos from Al-Madinah Municipality website (http://www.amana-md.gov.sa/Madinaexp/)

9.8.2 Vacant rough lands

Like farm lands, vacant lands are fragmented across each type of land use as shown in the Map in figure 9.11 in macro scale, or in the other maps in micro scale for both planned and informal areas in figure 9.13. Implementing the neighbourhood form and model shown above in Figures 9.9 and 9.10 with more or less change in size of Hoash and number of dwellings surrounding them, would be an easy task for planners or urban designers who have more freedom with these areas to do so, but it is not the case when the plan is for contemporary areas, either informal, or with approved plans. Vacant lands are available far from the holy Mosque in Macro scale, but there are only small

Figure 9.12: 304 Farms fragmented in Al-Madinah
areas within the holy zone. The total area of rough and vacant lands including all main roads is about 28,252 hectares which is almost half of Al-Madinah’s total area. Moreover, it is about 60% of urban areas. They are either rough land around mountains and valleys, or neglected farm lands for future subdivision. Meanwhile, updating these areas in digital maps has been conducted by using both ArcView, and ArcMap, shows that the total area of mountains is about 15% of Al-Madinah’s total area. Yet, implementing the compact neighbourhoods within these areas is easy for the Department of Town Planning at Al-Madinah Municipality.

While the total area of the vacant rough lands is about 28,252 Hectares, the area reserved for services and utilities will be about 9,323 Hectares. Consequently, the area for neo-traditional neighbourhoods within vacant lands will be about 18,929 Hectares.

On the other hand, neo-traditional neighbourhoods, according to the above table of areas, and when the Hoash area is the same as the Prophet’s Islamic neighbourhood, which was about 2,500 m², the total area for houses in the model above will be about 7,000 m². The total area of the Hoash is 0.95 Hectares. Therefore the “One Hectare” can be considered as optimum for a neo-traditional neighbourhood in Al-Madinah. Figure 9.14 shows such a Neo-traditional Madini Neighbourhood Unit that fits the Al-Madinah case study (NMNU). Such a unit is almost one hectare in area (9,540 m²).

Applying such optimum measures on vacant rough lands will provide about 19,925 neo-traditional neighbourhoods which can be implemented to occupy about 32 dwellings in each neo-traditional neighbourhood, and this might dues even the area of 200 m² is more than the mean size of the traditional dwellings in Hoash. Consequently, the total in the vacant lands will be about 637,600 dwellings or households, and about 4 million capita. This means that a great potential capacity will be achieved in the case the above model is applied in the remaining vacant rough lands. Yet, it is said by Prophet Mohammed about Al-Madinah:

"I have been ordered by God to a town that eats towns. They called it Yathrib and it is Al-Madinah...,"

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But the problem is that the majority of this land is outside the holy zone of Al-Madinah. Yet the priority here is to be given to the inner vacant rough lands to be developed with this concept of neo-traditional neighbourhoods. Moreover, a flexible size for a Hoash is better as it avoids any conflicts with owners for each pattern of urban area as extant law may cause tenure problems and erosion of the Hoash again and again. So, the space of the Hoash should be governmental tenure but for semi-private uses for social activities and local daily leisure those residents of a neighbourhood may undertake within, and a secure open space for children and elderly people without traffic.
Table 9.9: Al-Madinah main land-uses and percentages

<table>
<thead>
<tr>
<th>Land use and patterns</th>
<th>Area Hectares</th>
<th>% Urban lands</th>
<th>% total Al-Madinah Boundary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transitional Areas</td>
<td>230.9</td>
<td>0.5</td>
<td>0.4</td>
</tr>
<tr>
<td>Public services &amp; Utilities</td>
<td>992.8</td>
<td>2.1</td>
<td>1.7</td>
</tr>
<tr>
<td>Farms</td>
<td>1,176.9</td>
<td>2.4</td>
<td>2.0</td>
</tr>
<tr>
<td>Informal Areas</td>
<td>1,597.2</td>
<td>3.3</td>
<td>2.76</td>
</tr>
<tr>
<td>Mountains</td>
<td>8,729.1</td>
<td>18.2</td>
<td>15.1</td>
</tr>
<tr>
<td>Planned Areas</td>
<td>16,793.8</td>
<td>35.1</td>
<td>29.06</td>
</tr>
<tr>
<td>Subdivided lands</td>
<td>19,614.8</td>
<td>41.0</td>
<td>33.95</td>
</tr>
<tr>
<td>Holy Zone Area</td>
<td>22,900.4</td>
<td>47.8</td>
<td>39.64</td>
</tr>
<tr>
<td>Rough, V. lands &amp; M. Roads</td>
<td>28,252.3</td>
<td>59.0</td>
<td>48.9</td>
</tr>
<tr>
<td>Urban lands</td>
<td>47,867.0</td>
<td>100</td>
<td>82.85</td>
</tr>
<tr>
<td>Total</td>
<td>57,773.0</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

A proposal of neighbourhood unit to be implemented in vacant rough lands. It includes 32 dwellings with two entrances, and only corner plots do not have a private backyard but each to have priority of corner shop in the area of garage as faire subdivision. Or corners can be left for extra shaded parking areas.

However for implementation of the model of the neo-traditional neighbourhood, samples from both patterns of planned districts and informal ones are required to examine scenarios of fitting the proposed block or ‘Neo-traditional Madinah

Figure 9.14: Neo-traditional Madinah Neighbourhood Unit as proposal model

A proposal of neighbourhood unit to be implemented in vacant rough lands. It includes 32 dwellings with two entrances, and only corner plots do not have a private backyard but each to have priority of corner shop in the area of garage as faire subdivision. Or corners can be left for extra shaded parking areas.

However for implementation of the model of the neo-traditional neighbourhood, samples from both patterns of planned districts and informal ones are required to examine scenarios of fitting the proposed block or ‘Neo-traditional Madinah

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Chapter Nine: De-fragmentation of space in Al-Madinah dwellings within Hoash Neighbourhood Unit' within each pattern, plus vacant rough lands as shown above. Figure 9.15 shows locations of samples of both planned and informal districts. Samples of planned area are taken from developed ones to reflect actual measures of approved plans, and the cost those are already paid for provision of infrastructure networks.

Figure 9.15: Selected samples of planned and informal areas regarding areas using ArcMap

9.8.3 Planned Districts

Planned districts are fragmented within and outside Al-Madinah's boundaries. Moreover, the majority of new plans, especially governmental grants plans are not developed yet, so that developments are fragmented too. Planned districts are analysed in two terms as follows:

- Area of residential use

Figure 9.16 and Table 9.9 show the planned districts within Al-Madinah's boundaries. Total area for planned land is about 35% of total urban land and about 29% of total area for Al-Madinah. Implementing the model is possible in complete vacant blocks as shown above in Figure 9.9. As shown before in chapter five, scenarios differ in planned areas in terms of high rise building areas which are within the Second Ring Road, or

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Chapter Nine: De-fragmentation of space in Al-Madinah dwellings within Hoash villa areas outside. Each pattern has its own solution as stated before. Of course, the whole areas are not allocated within for pure residential use, but for services, amenities and roads too. Moreover as mentioned before in chapter two that about 33% of planned area should be left for these uses and 67% for residential. Examining such ratios in the samples shown in figure 9.15 and measuring the total area for each sample, including areas of inner residential blocks, the area of the rest can be calculated for other uses.

Figure 9.16: Al-Madinah Planned area that form about 35% of total urban lands

Map is manually digitised and updated regarding to aerial photos from Al-Madinah Municipality and regarding to aerial photos in http://www.amana-md.gov.sa/Madinaexp

The size of the block in planned areas should be the size of the proposed neo-traditional neighbourhood, which will be variable in each plan, district and type of subdivision.
Chapter Nine: De-fragmentation of space in Al-Madinah dwellings within Hoash

Six samples were chosen from Al-Madinah’s various subdivision patterns and measured in terms of mean size of blocks. Figure 9.17 below shows the samples and their statistics. Areas of plans are between 9.4 Hectare and 25.5 Hectares with a mean of 17 hectares. Inner Blocks for all plans are measured using ArcMap after geo-coding the maps sourced from ArcView. Table 9.10 shows that mean areas of inner blocks vary between 0.25 and 1.5 Hectares. Of course, areas of neo-traditional neighbourhood will fit here very easily as proposed in both models in Figure 9.14 and Table 9.7 above as the mean is about 0.86 Hectares and it is not too small from the proposed one. It was shown at the start of this chapter how to subdivide a plot to make smaller ones and cancel the setback role at the front and sides. Only rear setback can be applied to provide either private or semi private courtyards in case neighbours cancel walls and share a bigger space.

![Figure 9.17: Locations of samples from planned districts with statistics, numbers seem small but been summarised in table below](image)

**Table 9.10: Statistics of inner blocks for samples of planned districts summarising map above and other six separate maps for each sample to show areas of inner blocks**

<table>
<thead>
<tr>
<th>Sample No</th>
<th>No. of inner blocks</th>
<th>Min area Hectare</th>
<th>Max area Hectare</th>
<th>Mean Area Hectare</th>
<th>Total Area Hectare</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>19</td>
<td>0.26</td>
<td>1.57</td>
<td>0.85</td>
<td>16.23</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>0.68</td>
<td>2.88</td>
<td>1.46</td>
<td>8.74</td>
</tr>
<tr>
<td>3</td>
<td>23</td>
<td>0.23</td>
<td>1.02</td>
<td>0.45</td>
<td>10.37</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
<td>0.43</td>
<td>0.92</td>
<td>0.63</td>
<td>6.34</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>0.74</td>
<td>3.24</td>
<td>1.53</td>
<td>15.32</td>
</tr>
<tr>
<td>6</td>
<td>22</td>
<td>0.08</td>
<td>0.41</td>
<td>0.26</td>
<td>5.73</td>
</tr>
</tbody>
</table>
Chapter Nine: De-fragmentation of space in Al-Madinah dwellings within Hoash

As shown above in figures 9.5 and 9.6 some plots can occupy three proposed neo-dwellings, and others can cover five. But this is for undeveloped plots and within the pure residential use of plots. In order to allocate the pure residential area for a planned district the area of services and roads should be deducted from the sample areas.

Table 9.11: Samples from planned district's areas, and percentages of roads % services within

<table>
<thead>
<tr>
<th>Sample No</th>
<th>Total Area Hectare</th>
<th>Area of inner blocks Hectare</th>
<th>% of blocks to total</th>
<th>Roads and services total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25.5</td>
<td>16.2</td>
<td>63.5</td>
<td>36.5</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>8.7</td>
<td>58</td>
<td>42</td>
</tr>
<tr>
<td>3</td>
<td>16.2</td>
<td>10.4</td>
<td>64.2</td>
<td>35.8</td>
</tr>
<tr>
<td>4</td>
<td>9.4</td>
<td>6.3</td>
<td>67</td>
<td>33</td>
</tr>
<tr>
<td>5</td>
<td>21.6</td>
<td>15.3</td>
<td>71.8</td>
<td>28.2</td>
</tr>
<tr>
<td>6</td>
<td>14.5</td>
<td>5.7</td>
<td>39.3</td>
<td>60.7</td>
</tr>
<tr>
<td>Total</td>
<td>102.2</td>
<td>62.6</td>
<td>61.3</td>
<td>38.7</td>
</tr>
</tbody>
</table>

Figure 9.18: Total area of sample2 from planned districts
Figure 9.18, and figure 9.19 above show areas of sample 2 from planned districts to summarize others in the same way to find out ratios of area of road and services to total areas of the samples. Consequently Table 9.12 below is a summary of all samples from planned districts and shows percentages of roads and services within each one. Only one sample strictly satisfies the ratio of the municipality which is 33%, but the rest are higher, especially sample 6, which is from the housing project and supposed to be very conservative in consumption of space. This is great proof that wasteful measures are applied in neighbourhood plans. Nonetheless, even in housing projects which should save in costs as they are projects for low income groups, they are still very expensive in terms of consumption of residential use for roads and other services developed in most new districts.

But in general, percentage of roads and services in planned districts is about 38.7, which is almost true as 5.7% may be parts of main roads. In this regard, the total pure residential land area is about 61.3% of the total planned area which is about 16,793
Chapter Nine: De-fragmentation of space in Al-Madinah dwellings within Hoash

Hectares as shown above in table 9.10. Thus, the area of pure residential area in planned districts is about 10,294 Hectares. As it is assumed above that the area of neo-traditional neighbourhoods is about one hectare, planned land capacity is for 10,294 neo-traditional neighbourhoods. Moreover if the number of dwellings for such a size of neo-traditional neighbourhood units is about 32 dwelling or neo-traditional houses then the total of dwellings will be 329,408. Consequently, capacity is made for a population of 1,976,448, which is more than the present population size by almost 50%.

The scenarios are only to re-allocate buildings within villa plots, but now cancellation of set back from front and both sides will save more space for either private or semi-private use if shared and opened by adjacent neighbours as shown above, to use backyards as an aggregation to form a shared Hoash as in both Figures 9.5, and 9.6. The transformation here is to a neo-traditional neighbourhood with more flexibility for development of attached row houses and a few semi-detached ones in general with affordable prices. Even in cul-de-sac systems open space is to be segregated and controlled by local residents to avoid traffic for both children and elderly people who will use the proposed open space in the middle.

Within the Second Ring Road where high rise buildings are allowed, a group of undeveloped adjacent plots should be merged to increase the area saved for semi open space even if it is not a play area and would not be on the ground or open to the sky but it would be more safe and secure for children and elderly people especially in grid iron traffic systems.

- Road length

Length of roads within urban land reflects the length of infrastructure networks and consequently costs of provision can be calculated with regard to length of roads. Samples of planned districts are examined using ArcMap to estimate costs of networks within planned districts. Figure 9.20 shows sample 1 from the planned districts and the length of its roads.

Table 9.12 is a summary for all the samples and their road lengths and length per hectare of the area. Again within the planned areas the sample from the housing project (no. 6 in the Table below) has the longest roads per hectare. In general the rate is 255 M / Hectare. The design of a housing project is more expensive in terms of provision of infrastructure networks even if the design is Cul-de-Sac based with looped collector roads.
Chapter Nine: De-fragmentation of space in Al-Madinah dwellings within Hoash

Table 9.12: Road length in planned districts and length per hectare

<table>
<thead>
<tr>
<th>Sample No</th>
<th>Total Area Hectare</th>
<th>Total length of roads Metre</th>
<th>M / Hectare</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25.5</td>
<td>5,420.2</td>
<td>212.6</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>3,653.1</td>
<td>243.5</td>
</tr>
<tr>
<td>3</td>
<td>16.2</td>
<td>4,808.7</td>
<td>296.8</td>
</tr>
<tr>
<td>4</td>
<td>9.4</td>
<td>3,033.6</td>
<td>322.7</td>
</tr>
<tr>
<td>5</td>
<td>21.6</td>
<td>4,401.5</td>
<td>203.8</td>
</tr>
<tr>
<td>6</td>
<td>14.5</td>
<td>4,712.3</td>
<td>325.0</td>
</tr>
<tr>
<td>Total</td>
<td>102.2</td>
<td>26,029.4</td>
<td>254.7</td>
</tr>
</tbody>
</table>

On the other hand, private and other subdivided plans seem smaller in terms of road length, but the housing project is fully serviced and developed. In other words, new plans have shorter length of roads but more people serviced by the infrastructure network while other plans have large plots, less density and fragmented development. Yet, huge saving could be made in full implementation and development rather than in incremental development. The only way to reduce length of roads is to reduce plot frontage so that more plots can be served by the same length of the road. Of course the frontage should be less than the shown above in the neo-traditional house.
9.8.4 In Informal districts

Fragmentation of informal districts is shown in Figure 9.21. They are scattered around the central zone and within the holy area. Their area covers about 1,828.2 hectares. Informal areas are about 2.8% of Al-Madinah’s total area and 3.8% of urban land. It is almost one tenth of planned lands. Most of such areas are within the holy zone of Al-Madinah and around the mountains and have main roads leading to Makkah to the south, Ar-Riyadh to the northeast, and Tabuk to the northwest. As these areas mostly have basic infrastructure networks they should be given priority of implementation because residents in such areas are those who most lack open spaces, and at the same time have small lots which are reasonable to buy and develop as the majority of the residents earn less than 8,000 SR as stated above. Before starting the implementation of neo-traditional neighbourhoods within informal districts two issues should be examined as follows:

- Area of residential use

Five samples are chosen from informal areas and measured using ArcMap, ArcView and ArcCatalog. Figure 9.12 above shows the five informal selected samples, but Table 9.13 below shows their statistics and areas of blocks within each one. Maximum block area does not exceed 2.0 hectares, and minimum area is about 500 m² which is only a fragment of an urban block. Such small blocks should be merged to form a neo-traditional neighbourhood with regard to the model and table above to afford open space which is greatly lacking as described before in chapter eight.

Table 9.13: Statistics of inner blocks for samples of informal districts

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>No. of inner blocks</th>
<th>Min area Hectare</th>
<th>Max area Hectare</th>
<th>Mean Area Hectare</th>
<th>Total Area Hectare</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12</td>
<td>0.2</td>
<td>1.79</td>
<td>0.65</td>
<td>7.83</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
<td>0.15</td>
<td>1.92</td>
<td>0.56</td>
<td>7.78</td>
</tr>
<tr>
<td>3</td>
<td>35</td>
<td>0.05</td>
<td>1.38</td>
<td>0.35</td>
<td>12.17</td>
</tr>
<tr>
<td>4</td>
<td>26</td>
<td>0.09</td>
<td>1.18</td>
<td>0.35</td>
<td>8.96</td>
</tr>
<tr>
<td>5</td>
<td>29</td>
<td>0.033</td>
<td>1.56</td>
<td>0.48</td>
<td>13.97</td>
</tr>
</tbody>
</table>

To use the above Model for informal areas, means of block size have to be allocated for informal areas. Then, purely residential areas should be calculated. The same calculations as were shown for planned districts are made for informal samples. The total areas of samples and total areas of inner blocks have been calculated to provide the ration of roads and services within each sample and in total. The table below shows that...
roads and services areas vary between 17.6% up to half of the total area. In case of low ratio this means that informal areas have very narrow roads and lack most services and amenities such as spaces for playgrounds as shown clearly in the figure below.

![Map of Al-Madinah Informal areas](image-url)

**Figure 9.21:** Al-Madinah Informal areas form about 3.8% of total urban lands

Map is manually digitised and updated regarding to aerial photos from Al-Madinah Municipality and regarding to aerial photos in [http://www.amana-md.gov.sa/Madinaexp](http://www.amana-md.gov.sa/Madinaexp).

But in other high ratios it might be because of neglected informal land or because open space is not worth developing or the landlord is speculating for the near future. Figure 9.23 below shows large spaces left vacant. This land is mostly serviced with the basic infrastructure networks as they are located within and around the holy zone of Al-Madinah. They should have priority of development with such neo-traditional measures of dwelling and neighbourhoods.
The total purely residential areas in informal districts, regarding the total ratio of blocks to the total area are 63.3, will be about 1,157 Hectares. This is about 1,157 neo-traditional neighbourhoods, which include 37,024 neo-traditional houses, which house a population of 222,144. Compared to planned districts, potentiality of informal districts
is not that big a deal but because of their location and the high negatives they have greater priority even if they are minorities.

![Map showing Sample 3 from informal districts with its inner blocks and statistics]

**Figure 9.23:** Sample 3 from informal districts with its inner blocks and statistics

A large amount of land is left vacant for future rise of price

Table 9.14: Samples from planned district areas, and percentages of roads & services within

<table>
<thead>
<tr>
<th>Sample No</th>
<th>Total Area Hectare</th>
<th>Area of inner blocks Hectare</th>
<th>% of blocks to total</th>
<th>Roads and services total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14.6</td>
<td>7.8</td>
<td>53.6</td>
<td>46.4</td>
</tr>
<tr>
<td>2</td>
<td>11.4</td>
<td>7.8</td>
<td>68.4</td>
<td>31.6</td>
</tr>
<tr>
<td>3</td>
<td>24.5</td>
<td>12.2</td>
<td>49.8</td>
<td>50.2</td>
</tr>
<tr>
<td>4</td>
<td>12.7</td>
<td>9.0</td>
<td>70.9</td>
<td>29.1</td>
</tr>
<tr>
<td>5</td>
<td>17</td>
<td>14.0</td>
<td>82.4</td>
<td>17.6</td>
</tr>
<tr>
<td>Total</td>
<td>80.1</td>
<td>50.7</td>
<td>63.3</td>
<td>36.7</td>
</tr>
</tbody>
</table>
Chapter Nine: De-fragmentation of space in Al-Madinah dwellings within Hoash

- Road length

Samples from informal districts are examined using ArcMap in terms of length of roads. Table 9.15 summarizes statistics for samples from informal districts. Length of roads varies between 235 and 352 M / Hectare. Figure 9.21 shows roads within a sample from informal districts and the road length. In such a case length appears greater than the mean. At the same time it is not the maximum but higher than the mean in planned areas.

![Selection Statistics](image)

Figure 9.24: Sample5 from informal areas and length of roads within

In general it is less than 300 M/ Hectare but it is longer than planned districts with 38 Metre / Hectare. This means extra cost of infrastructure networks per Hectare with SR 1.25 million. In the informal districts in Al-Madinah the government paid an extra SR 2,285 million than if these areas were planned as current planning policy and regulations.

Informal areas are not the best form in costs of provision of infrastructure networks, yet the government has already paid for these networks and they have the priority for redevelopment with neo-traditional measures of both dwelling and neighbourhood regarding the model and its table shown above, earlier in this chapter.

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3 Base on cost of ducts, wires, pipes, and manholes for infrastructures is 33,000 SR /m sourced from An-Naim and Yousef Neyazi 2005
Table 9.15: Road's length in informal districts and length per each hectare

<table>
<thead>
<tr>
<th>Sample No</th>
<th>Total Area Hectare</th>
<th>Total length of roads Metre</th>
<th>M / Hectare</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14.6</td>
<td>3,423.9</td>
<td>234.5</td>
</tr>
<tr>
<td>2</td>
<td>11.4</td>
<td>3,480.8</td>
<td>305.3</td>
</tr>
<tr>
<td>3</td>
<td>24.5</td>
<td>6,593.6</td>
<td>269.1</td>
</tr>
<tr>
<td>4</td>
<td>12.7</td>
<td>4,473.2</td>
<td>352.2</td>
</tr>
<tr>
<td>5</td>
<td>17</td>
<td>5,424.4</td>
<td>319.1</td>
</tr>
<tr>
<td>Total</td>
<td>80.1</td>
<td>18,820.8</td>
<td>292.1</td>
</tr>
</tbody>
</table>

In contrast where planned districts are shorter in general length of roads per hectare, they have fragmented development which means that infrastructure costs are covered by clients. Moreover, size of plots is larger which means less density and consequently slower recovery of costs.

9.8.5 In the Holy Zone of Al-Madinah

As shown in Figure 9.25 the holy zone covers about 22,900 hectares. This means in implementation of the model of the Neo-traditional Madinah Neighbourhood Unit, about 22,900 NMNU's will be included. This will include 732,800 Neo-traditional houses which house a population of 1.43 million which is more than the population in 2001 within the Al-Madinah boundaries (area of Holy zone * ratio of 37.7 the mean of planned and informal purely residential areas). Consequently plenty of spaces within holy zone are potentially for development with the use of the de-fragmentation concept. But large districts are developed outside the holy zone especially in the western and south western part of Al-Madinah. But others sides are also approved as plans, but developments are not yet widely fragmented as in western and south western parts those required huge fund for provision of infrastructure networks.
In case of implementation the Neo-traditional Madinah Neighbourhood Unit, holy zone can occupy three times of population as in the whole population in Al-Madinah in 2001.
9.9 Conclusion of De-fragmentation of urban space in Al-Madinah

As shown above, urban space may be de-fragmented in Al-Madinah starting with the bottom up model from the basic unit of the plot that the household dwelling occupies, to a neighbourhood that gathers a group of dwellings around a courtyard or 'Hoash', and then the city as a whole. This approach of concept deals with the policy of building regulations within neighbourhood planning in Al-Madinah specifically and in Saudi in general. In the case of implementing such methodology, measures and satisfaction levels should be based on entries from each city.

The approach of de-fragmentation is to replace wasted and unused spaces with more useful ones. It works in both qualitative and quantitative dimensions and within three levels as follows:

9.9.1 Dwelling unit: Neo-traditional house and a family house

At this level spatial and quantitative ‘De-fragmentation’ reduces consumption for residential space to 50% of the minimum measure\(^4\) of plot which is 400 m\(^2\). All measures are related to Al-Madinah resident’s satisfaction with room sizes. All sizes of room have been integrated and designed within a compact dwelling that fits the mean size of household in Al-Madinah which is 6 capita/household.

De-fragmentation cuts costs of plot prices and then building construction. Moreover, it saves 13.3% of REDF loans for households. It also reduces monthly payments, if the plot is bought from developers, by more than half. Yet the majority of residents and especially those mentioned in chapter 8 who earn less than 8,000 SR can afford developed dwellings with affordable prices, or can buy small plot and build on it with reasonable costs.

Meanwhile, in the qualitative dimension, the proposed dwelling is related to the majority of residents who were questioned. A separate dwelling in the form of a house with its own entrance is considered to be the best type of dwelling. A private garage, a backyard for a safe and secure play area for very young children and for females and family seating are provided. The dwelling is extendable in size to occupy an extra extended family, either a married son, daughter, or relative. This characteristic makes the dwelling a real house that is regarded as home that reflects its cultural values in

\(^4\) As mention before in Chapter 1, 4, and 8 that the smallest allowed size of plot in new subdivision plan is 400 m\(^2\) from building codes and regulations MOMRA, M. o. M. A. (1994). Goals and design policies and most important planning measures for preparation of residential land subdivision 'Arabic'. Riyadh.
terms of a family house and integration between spaces and rooms and segregation between male’s and female’s rooms. Private toilets are designed for the master bedroom to satisfy the privacy of husband and wife from domestic workers who should not see them undressed. Then, it is fully segregated in terms of the guest section and private section not only by doors but also by level with private family accommodation on the first floor, and guests on the ground floor. Integration is reinstated between functional areas such as between dining rooms, guestrooms and the kitchen. Another section is between the living room and family bedrooms. All these qualities in a proposed house persuaded the author to call this dwelling, as phrased above, the ‘Neo-traditional Madini House’.

9.9.2 Neo-traditional Madini Neighbourhood Unit

At this level, the approach of de-fragmentation is applied in terms of evaluating temporary neighbourhoods qualitatively as attached subdivided plots, but detached dwellings and consequently segregated neighbours and fragmented developments. Moreover, the informal districts, which are mostly within the holy zone, and around mountains and valleys are also fragmented. Farmlands are also fragmented because of speculation for fast revenues of subdivision rather than from agriculture. But regarding the model in chapter five of the traditional neighbourhood and relationships between courtyards and the number of dwellings around, this has been compared with the relationship between the area of a courtyard ‘Hoash’ and total area of dwellings or ‘Neo-traditional Houses’ around it.

The Model is created with flexible measures to make it applicable in any vacant unsubdivided urban lands, subdivided undeveloped blocks, informal obsolescent blocks, or neighbourhood plans in the process of approval. The model is related to the Islamic traditional first block of Prophet Mohammed that he made when he first arrived in Al-Madinah fourteen centuries ago as stated in chapter five. Moreover, it is related to ‘Ahwash’ the plural of ‘Hoash’, which were the traditional form of neighbourhood in Al-Madinah until 1990.

The proposed model is related to traditional ones, and based on the measures and integration of neo-traditional houses around open spaces for neighbourhood activities and yet it is called as above the ‘Neo-traditional Madinah Neighbourhood Unit’, and assumed as a model to be applied in forming urban land with a flexible policy of neighbourhood planning. The measures in the proposed model and shape are not fixed
and strictly controlled but are flexible to be fitted into any pattern of urban lands in Al-Madinah city. This adjustment of urban space is necessary because it reduces wasted spaces and assumes priority of development to be the nearest to the central zone and within the holy zone. In contrast it provides more usable spaces which are lacking in most contemporary neighbourhoods, either in planned or informal ones.

In the quantitative dimension, the model decreases the general area of neighbourhood sizes that is mentioned in chapter 4 to only about 32 houses housing 192 people. The size of forty neighbours is culturally narrated by Muslim resources, the same as the Prophet's first block in terms of houses surrounding the courtyard.

In the qualitative dimension such a concept of semi-private courtyards provides a safe and secure space for children to play, and elderly men to relax while sitting and talking together, and a semi-private space for all activities such as gathering, seating, parties and celebration and festivals.

### 9.9.3 Al-Madinah Neo-traditional Islamic City

De-fragmentation of space in dwellings and then in the neighbourhoods, will de-fragment wasted spaces, which are undeveloped in the city holy zone which should have the highest priority for development. The priority is because it is recommended by the Prophet not to go out of it or leave Al-Madinah.

The de-fragmentation concept will increase capacity of Al-Madinah to occupy with neo-traditional measures three times the recent population only when the model is applied to all the urban land or they follow the traditional form of neighbourhood and house. Al-Madinah's capacity includes 30,013 (area of urban land * ratio of 37.7 the mean of planned and informal purely residential areas). This means that it will occupy 960,416 Neo-traditional houses and 5.8 million people which is more than three times as much as now.

Giving a ratio of road length per hectare for the proposed neo-traditional number requires more research to forecast how it differs when blocks are ordered and allocated in districts.
Chapter Ten: Conclusions

"Make no little plans; they have no magic to stir men's blood and probably will themselves not be realized. Make big plans; aim high in hope and work, remembering that a noble, logical diagram once recorded will not die" (Daniel Burnham)
10.1 Introduction:
Neighbourhood planning is a dilemma that is theoretically fragmented between urbanism, architects, socialism and planners. Many theoretical architects and professionals in the developed world have tried to draw up community formation via spatial adjustment, but through using more control codes and regulations. Others in the developing world have copied such models, policies and regulations without adjustment to meet their societies’ socio-cultural characteristics and in some they have lost and misplaced their traditional urban forms due to transformation coupled with globalization. Saudi Arabia was one such country. The result was fragmentation of urban developments among Saudi cities. Urban patterns in Al-Madinah seem fragmented between three types of urban patterns, farms, and mountains. Such fragmentation is mostly caused by the neighbourhood’s planning policy and building regulations with wasteful measures.

This dissertation proposes models of defragmented dwelling unit and neighbourhood unit too. These successes of these models achieved in terms of compactness of dwelling unit and neighbourhood unit to minimize the cost of dwellings in order to offer affordable prices, and to reduce the cost of infrastructure network provision between fragmented urban developments. The study is based on empirical field survey; empirical data entry, handling, analysis, and calculation; application of urban information systems that are not completely benefited by local authority in Al-Madinah in term of neighbourhood planning. Each part of the contribution is detailed below before listing the final conclusions and recommendations.

10.2 Empirical field work
Urban fragmentation is seen as the general theme in Al-Madinah as it neither reflects its traditional urban form, nor cultural identity that has been sustained for fourteen centuries. The problem is seen by the author in the policy of neighbourhood planning in Saudi in general as decision making which is central with a top down flow in Al-Madinah in particular, as it is unique and differs from other Saudi cities and even from other Islamic ones.

The primary research approach was a physical one only in the process of qualitative subdivision with a quantitative one in terms of building regulation ‘codes’ as measures. Later with direction and supervision and with regard to previous research such as Al-Harrbi (1998), who did a similar investigation with an international view into pilgrims’
satisfaction with housing in Al-Madinah’s Central Area—which was newly developed instead of the traditional Old Madinah, the author integrated his approach with social investigation and satisfaction levels about the contemporary built environment and their actual needs. Yet the research area of study in Al-Madinah was in the outer zones away from the central one, where local people live and disperse in segregated plots within subdivided districts but not neighbourhoods. Such segregation was a problematic issue of space configuration within dwellings or around them and within subdivisions of neighbourhood plans. The main themes for investigation were about contemporary built environments, social-economic data of residents and satisfaction with their housing measures and services and utilities within neighbourhoods. At first the proposed title of this thesis was ‘Wasteful Building Codes’ when starting to analyze the data. Meanwhile, a questionnaire was carefully designed to fulfill the author’s quest about these themes. Previous research questionnaires and methodologies were revised and the intention was to integrate the contribution of other researches about Al-Madinah’s built environments.

Field work was held in 2001 for three months and then extended for another two for data collection and interviewing professionals, decision makers, infrastructure sectors and residents. Difficulties occurred because social life and customs regarding hospitality while filling in questionnaires, prayer time, work time and privacy of the Harem had to be obeyed, as shown in chapter four. But during work time the researcher was doing interviews with professionals and decision makers in their work places and left the evening time for questionnaires, consultants and real estate agents. But at last, the work has been done. The author interviewed urban planning decision makers at Al-Madinah Municipality who play a part role in the subdivision process and a few landlords who own plots and have a major role as stated before by Abdulaal (1987). Moreover, he interviewed staff from all related governmental and infrastructural sectors such as the Water Agency, Electricity Company, Saudi Telecommunications, Real Estate Development Fund (REDF), developers, real estate agents, and more than 300 residents according to the sampling methods shown in chapter four. Only 267 questionnaires were included in the data, because only complete answers for all the questions from careful respondents were used, while incomplete ones were excluded. Self tutorial sessions for SPSS were undertaken by the author for data entry, coding, calculating, analysis and layouts. Supervision was very useful in coding issues.
Nonetheless, digital maps were gifted by the Mayor of Al-Madinah Municipality to the author for research purposes. Training sessions were also undertaken by the author via the Esri Virtual training centre. Courses for ArcView and introductions to ArcGIS were attended virtually and certificates gained. Such skills are very useful for dealing with digital data instead of manual maps in the field of Urban Planning in the twentieth century. Explorations are very clear in the illustration of figures and layouts in all the chapters. Moreover, advanced skills of space syntax were used for space analysis within dwellings and within block clusters or 'Hoash as Neighbourhoods'. Both analytical tools are assumed as important ones for future urbanisms, planners, architects, geographers, sociologists and psychologists researching the behavior of mankind within the built environment. Also digital photography and other basic skills such as Paint in Office 2002 and Excel were used in this research for the final presentation of most chapters.

Text materials, reports, maps, conference proceedings, researches, magazines, newspapers, personal meetings, normal chats with friends and relatives were used to enrich the research related issues. In sum, all these data were gathered during field work, during literature reviews and conference participations to fulfill a greater knowledge for the researcher and to enrich the contribution of this research in the field of neighbourhood urban planning in Saudi Arabia in general and in Al-Madinah in particular as a unique form of neighbourhood planning theory with a unique title that notes the current situation of urban fragmentation and social dispersal.

The research approach is coupled and flourished with socio-economic investigation to adjust buildings to actual needs and capabilities of households to develop their own satisfactory dwellings with affordable prices.

10.3 Empirical data entering, coding, handling and analysis

All the data collected from field work was entered, coded, manipulated and analyzed by the author. Questionnaires were answered in Arabic as shown in the appendix of the actual example, so the author had no choice but to enter all data personally. Moreover, all software required as tools for analysis were either learned virtually or by running tutorials that came with the software. In both cases this training and learning how to deal with new software was time consuming. The first training sessions for GIS were held in 2000. After the field work was finished, SPSS tutorials were held for practical data entry of the questionnaires. Such huge data from the questionnaires required extra
calculation and new variables for extra analysis and to represent final tables, figures and graphs shown in previous chapters.

Nonetheless, digital maps were entered and worked in ArcView and a few months were consumed in data reshaping from its original format to that needed in ArcView format. With the huge size of data it was hard to save and most was entered and reshaped then stored in zip files in early 2002. But when the author found time for the final analysis in 2005 and because of data corruption when transferring data from zip drive to a laptop and CD’s, all the work was lost and only original format maps remained. The author repeated all the processing of shape files for 107 digital maps from CAD format to ArcView one. Moreover, for further applications and analyses, such maps after shape filing were not enough to show the areas he really wanted to show and present. Yet this extra process of data reshaping for ArcGIS (the most recent software of GIS) was needed. Some maps shown in early chapters are shown using ArcView and others shown in later chapters are shown in ArcGIS. Maps in ArcView format were used for Arc Catalog (GIS database tool for analysis). Furthermore, and because of technology hang ups problems (laptop), sometimes data was lost and work had to be repeated again. But at last, the author managed to deal with and overcome such problems, by saving his work step by step and copying pictures and easily saving a hard copy of the final results he obtained. Such skills in term of technological applications, and coherence between them are very useful tools in presenting this research as shown. It was very useful to use Paint as a basic tool to copy and paste in order to reduce the size of files and maps. Moreover it was used for free drawing of the pictures which had been stored in the author’s mind for years. In general, such skills consumed time and effort on the part of the author in order to accomplish this thesis as it is shown.
10.4 Contribution of De-fragmentation of Urban Space

De-fragmentation of space is a new title for an approach in the field of urban planning. It tackles dispersed random developments that do not follow regulations and codes and do not use order and priority. Yet, it deals with the urban policy of the neighbourhood process and relationships with actual residents' characteristics. It has a cycle that starts reading the city districts, then the dwellings within. Then it analyses urban policy, regulations, measures and codes and levels of residents’ satisfaction with regard to their built environment and amenities within both categories of neighbourhood and dwelling in both a qualitative and quantitative manner. The analyses are based on urban information systems, and then based on the results of the analysis, it sets, adjusts and modifies measures and building regulations that would be flexible enough to enable households to afford their own dwelling with every satisfaction regarding quality and quantity. Such measures and codes will create the dwelling unit's type and size. This type and size is called in this research and case study the 'Neo-traditional Madini House'. It assumes the basic unit of personal spaces of rooms and utility areas after de-fragmenting wasted areas. It is the urban unit that forms a home for the household, which is an integrated relationship of individuals. Both units are those which weave the city and its life within.

De-fragmentation then examines the urban unit within the next larger urban category of the neighbourhood. It examines contemporary neighbourhoods within cultural and traditional contexts and relates to residents' satisfaction levels in terms of the amenities they need. Moreover, it explores the various district patterns of subdivision. Finally it builds a flexible model for the neighbourhood based on the traditional urban form and concept with the application of measures and codes for the urban unit that reflects those actually needed. This will construct the form and concept of a traditional neighbourhood with the assumption of neo-traditional houses as units. This is called the 'Neo-traditional Madinah Neighbourhood Unit'. It has a unique form and size which is smaller than most used by planners and researchers in other countries and cities in Saudi.

In the short term, de-fragmentation may face increased costs for new comprehensive development of blocks and neighborhoods. But, it recommends planning regulations with flexibility and priority of developments especially near the city centre. This is to develop fragmented vacant lands; to use the built infrastructure networks and to reduce...
fragments of developments outside the coverage of infrastructure networks. On the other hand, it reduces the cost of the provision of infrastructure networks for the new far fragments developments, which were originally based on wasteful measures of building codes and regulations. This will make huge savings for the government, developers and most importantly for households. These can be shown as below in the main findings. The researcher contributed with part of these in two main Arabic International conferences as follows:


The conferences were very interesting and valuable for the author in terms of topics he shared with participants and audiences and to meet with the main references to his research, especially Besim Hakim, Saleh Al-Hathloul and Mohammed Eben Saleh, who have made great contributions to the field of urban planning in Islamic and Arabic built environments.

The research is designed and structured regarding the methodology of the urban planning cycle that enables a researcher or planner to read the city from a large scale with a general background to a deeper look into the city context in neighbourhoods and then to dwellings related to socio economic and cultural context too. Reading is from the top-down but re-planning or de-fragmenting of space is bottom-up for space adjustment, setting and starting from a small scale in the ‘Neo-traditional Madini House’, to a larger ‘Neo-traditional Madinah Neighbourhood Unit’ or ‘Hoash’ in Arabic. Then to examine and evaluate future neighbourhood plans in the early stages before approval with simple ticks and procedures using urban information systems, especially when the digital era is widely spread. Then it provides the process and procedures to use as a model for the estimation of future population capacity of any city with various scenarios in case urban policies for space must be changed. The main findings below show the contributions of research for urban planning and urban policy when de-fragmentation is applied in the Al-Madinah case study.
10.5 Summary and Main Findings

These findings are subdivided in regard to the main objectives and their questions shown in the first chapter. They are as follows:

1. Defragmentation of space as new notion of seems as an optimum name of research and methodology those are described early in chapter one and in the above section 10.5. Moreover it tackles the problem of the fragmentation of urban development. It is a new notion and field and is a new approach to looking at urban patterns during the process city planning.

Defragmentation means the process of adjustments to building regulations 'codes' to optimize the satisfactory minimum measurements of the parts of the dwelling, to compact the dwelling size in order to fit socio-economic characteristics of Al-Madinah residents. This process of techniques is to consolidate the fragmented urban form patterns. These fragmented patterns are caused mainly by the wasteful neighbourhood planning policy and building regulations.

Defragmentation is used in the Al-Madinah case because of vast urban growth while many vacant lands are left without development around the city centre and in new plans, and informal areas as gaps between new developments and the holy zone. Moreover, defragmentation proposes more capacity within the holy zone than currently exists, as this is a desire for most Muslims; to live in Al-Madinah and within this zone.

2. The literature review shows that early theories in developed countries had the same focus of research in terms of neighbourhood concepts but differed in size and socio-economic and cultural characteristics and had very strict control of policy and building codes. Later theories show the need to extend past theories in new urban areas. Islamic theories had totally different principals. They are based upon the Islamic law from the Quran and Sunna, but later and after the industrial era, urban planning policies and principals were imported to Islamic cities with few exceptions.

Local literature shows the copying of western theories and concepts, then applied without adjustment to local entries, except for a few recent studies which are still very large neighbourhoods and these misunderstand the concept of neighbourhood with Islamic reference especially in the case of holy cities?. Yet, current neighbourhood planning policy and building regulations don't fit with the actual needs of residents and do not take into account their socio-economic characteristics.
3. **Al-Madinah ‘the study area’**

Al-Madinah was the first Islamic city to form both society and urban structure at the same time based on the main Islamic law and principals sourced from the Quran, Sunna and Urf. It was allocated to be the study area because it had a unique form and differed from other Islamic cities in both qualities of dwelling houses without courtyards and neighbourhoods around open spaces -‘courts’- which were called ‘Ahwash’. In both, spaces were based on Islamic principals such as personal and neighbourhood rights, privacy and route rights. Such a built environment was sustained and remains the traditional form of old Madinah until a decision to comprehensively develop the central area around Prophet’s Mosque (PBH) was made and to demolish the whole of the traditional city of ‘Old Madinah’.

At that time architects, planners, urban designers, neo urbanisms -if there were any-, sociologists and decision makers did not take the lesson of the traditional urban form and relationships of social structure of the community and the meaning of neighbourhoods within each ‘Hoash’.

New districts were planned outside central areas, but there were informal areas surrounding the central zone, yet the new developments were on the fringes after the informal areas and sometimes outside the holy zone. New urban developments became fragmented in all directions and far from the Prophet’s mosque and city centre. Urban form consequently became fragmented between old transitional forms, informal areas, new planned areas, and vacant lands and gaps between farm lands, and mountains.

Meanwhile, the society as a community was fragmented too. Social relationships between neighbours became weak and mostly lost, just like the traditional identity of the urban areas. The main findings from the context of the study area are as follows:

- **Al-Madinah covers an area of 2,600 km².** The urban land is about 82% to total. Farm lands are about only 2%, mountains area is about 15%, informal total area is about 3 %, and planned lands are about 70% but only 30% of which is developed, while the rest goes under vacant lands which comprises about 49% of the total area, yet fragmentation is there.

- **Al-Madinah contains 1.4 million people,** with 240,000 households of an average of 6. About 70% of the population lives in apartments; 21% in villas; and only 9% in
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traditional houses. Yet, the majority of residents do not own their own dwellings. They are either tenants or live in dwellings owned by relatives.

- The majority of households in Al-Madinah earn less than 8,000 SR monthly, yet they tend to live as tenants in temporary dwellings either in apartments in high rise buildings within the 2nd Ring zone; apartments or houses in informal districts which are near the central zone and have low rent rates but are un-popular in terms of quality of neighbourhood and amenities; or in apartments of one story in converted dwellings in the villa zone outside the 2nd ring zone. Sometimes, such dwellings are located outside the holy zone too. This is because monthly income is not enough to pay rent, living costs and to save to build a home, yet the urban policy doesn’t fit with their socio economic characteristics.

- Neighbourhood planning and building regulations are very wasteful in consumption of space. Consequently, Al-Madinah residents find difficulties in buying plots and building their own homes. Even if they have plots they are either far away, un-serviced, or very expensive to build because of the large size, especially in grant plans.

- The mean size of households in Al-Madinah is about 6 / dwelling, and developers who provide temporary dwellings as apartments for letting tend to assume this in their designs of dwellings in terms of quantity.

- Urban policy and regulations are still fixed and unchangeable to fit with residents’ demands in terms of size of dwellings and housing funds, not in upgrading the poor amenities in informal districts. Large amounts of vacant land are fragmented over Al-Madinah’s boundaries in the planned areas or informal districts.

- Urban development is fragmented mainly in vacant rough lands and new planned lands because of a lack of infrastructure networks and other amenities and in informal districts because landlords speculate on future price increases and developments even if they are not attractive areas.

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1 Grant plans are subdivided by local government and granted for citizens 625 m² for free and if a plot is more than this area, the citizen then should pay for the extra area, yet municipality subdivide such plans into large plots so that more revenues will be raised.
4. Research methodology

The problem of urban fragmentation draws on the methodology that is based upon reviewing all related literature, and evaluating the current urban, socio-economic conditions of the residents of Al-Madinah city. The main findings in regard to methodology are as shown below.

- Doing the questionnaire and personal interview for research purposes may face difficulty in terms of responses especially regarding the type of information which may include family questions, income, and entering the private section of the house and time for resonance. Yet, this a main issue for researcher who aim to conduct research in Saudi Arabia.

- Urban information systems may be very useful in sampling the data needed for research such as socio-economic data. This can be sourced from census data, but when the research was started, the census was not finished and the bureaucrats still there so data may not be sourced in a formal way. Author sent emails asking the census authority for final report of Al-Madinah, but response was that it is not finished yet.

- The structure of questionnaires is reflected very clearly in the process of defragmentation. Questionnaires start with households’ socio-economic characteristics to know more about the people who live inside dwellings, then their satisfaction about dwellings, and lastly satisfaction with their neighbourhoods.

- Data collected personally; by filling in questionnaires with residents; interviewing planners, architects, and decision makers who are related to neighbourhood planning; digital data and samples of permits from Al-Madinah Municipality archives.

- Data entries and analysis were personally conducted by the author using SPSS, ArcView, ArcGIS, and space syntax diagrams. These tasks consumed most time, but were enjoyable when results were gained.

- Cultural issues and tradition consumed time during data collection. An example is the hospitality of residents when offered tea, coffee, dates and social meetings, yet the researcher had to follow and to research his data in between such social life, which had to be respected. Extra time was needed to complete data collection.
• Use of technology is also a time consuming and frequently unpredictable, but researchers should be patient especially in data entry, coding, analysis and presentation. It provides better quality in an accurate scale and measurements.

5. Al-Madinah traditional and contemporary neighbourhoods were shown in chapter five as an evaluation of contemporary districts compared with traditional neighbourhoods, how transformation occurred and what urban and social consequences resulted. The main findings are as follows:

• Al-Madinah’s traditional neighbourhood form was started originally by the Prophet fourteen centuries ago and it was built under Islamic law which is sourced from the Quran, Sunna and Urf. Its concept was an open space for multiple activities surrounded by houses. The open space was about 2,500 m² in area with about 40 houses around it.

• It is only sustained in Al-Madinah and may be seen in a small part of Egypt and parts of north west African countries because of the Islamic Maliki School ‘Math’hab’, which spread there and then was followed by other schools later. This remained in Al-Madinah until the old city was totally demolished and re-developed with different patterns of subdivision.

• Alternatively, the form of the traditional neighbourhood was transformed either into a multi-storey building that includes many dwellings, or into the villa form of subdivision plans. In both, the shared semi-private open space was either wasted or fragmented.

• Analysis of traditional neighbourhoods related to data sourced from previous researches and maps, shows a linear relationship between size of open space and the number of houses surrounding it, which was modeled as an equation that allocates the number of houses if the area is known and the area of open space if the number of houses is known.

• Restructuring of urban segregation of pedestrian and traffic movements doesn’t offer a neighbourhood but provides safer play areas for children in some way, which is difficult to implement for local government or developers.

• Cul-de-Sacs do not seem to offer a semi-open space for people as the Hoash did, but are a semi-public space for vehicles.
6. Satisfaction with regard to their contemporary districts shows that they are satisfied with some and dissatisfied with others. Satisfaction query of residents is similar as participation in decision making especially if research is dealing with urban policy. Considering satisfaction levels is a main task for planners during the process of neighbourhood planning. The main findings of satisfaction with neighbourhoods are as follows:

- Most negative satisfaction levels regarding neighbourhoods are those related to open space and recreational areas, shaded parking, nurseries and fitness clubs
- The main factors affecting the level of satisfaction are ownership of a house; type of neighbourhood; type of dwelling; household' income; nationality and marital status
- Analysis shows that Al-Madinah’s districts are not very neighbourly in terms of 26 negative satisfaction responses of the variables mainly around open space and the development process, costs and amenities especially in new planned areas, informal areas and in old high rise districts
- Positive satisfaction was related to 32 variables, but mostly to main services and amenities especially in old planned areas and informal areas as they are well serviced and in new high rise areas. The highest was with local mosques which shows how life is strongly related to Islamic law in Al-Madinah
- In general outlook neighbourhoods are fragmented and so is society because of patterns of subdivision and urban policy applied especially to dwelling units within neighbourhood plans

7. Dwelling quality and design based on building codes
- Al-Madinah has three main types of dwellings: apartments; courtyard houses and villas. But none reflects the real traditional homes in Al-Madinah and even courtyard houses are in the form of the rural pattern of Bedouins but not the urban residents. Most residents of apartments are those who earn less than SR 10,000, while only the high income groups are those who live in villas. Labourers and the poor are those who live in informal areas with houses with tiny areas and poor conditions.
- Al-Madinah’s traditional houses were non-courtyard houses, compared with other Saudi traditional houses which have a courtyard.
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- Space syntax analysis of designs shows that traditional houses are segregated with a level of privacy constraints. The private section is very far from outdoor space. The guest section is to the left of the entrance.

- Traditional house were compact in size and extendable in the roof area, but now they are very rare to find and if so will be in bad condition for they are poorly maintained.

- Apartment’s dwellings vary in size, but most are large with three or four bedrooms. The majority of residents stay as tenants of the apartments temporarily so that the majority live in them for less than five years.

- Space syntax analysis shows that even apartment dwellings space structure is formed in regard to cultural constrains yet gamma diagrams seem almost the same as for traditional homes with small changes related to changes of socio-economic characteristics. An example is the existence of a domestic worker in the home requiring the design of a private toilet for the master bedroom and gender segregation in bedrooms according to Islamic law.

- Integration of space is left between related areas such as guest and dining rooms with the kitchen; the private section and a living room etc.

- In villas on housing projects, space syntax shows that dwellings are well integrated with fewer spaces. Even with integration with open space (private backyard) they are very satisfied, even if the location is far from the central zones.

- In the private villa, it shows a very complicated diagram, as it reflects that the resident is a grandfather who invites his extended families frequently and the guest section is available not as a room, but as sections.

- Yet, the sum of satisfactions levels between the three types will resulted that the type of villa in term of future extendable, and in villa in term they are within services areas, and in term of the house in term of back to traditional form of privacy and segregation between private section is by floors not by doors. Yet, the results will lead to finding new dwellings with satisfactory designs.

8. Dwelling quantity in contemporary districts

- The size of dwelling units in Al-Madinah shows wasteful measures applied within new neighbourhood plans as building codes and regulations. Space
consumption is not only in room spaces but also in utility areas and fragmented outside as it is setback from all sides.

- The greatest factor affecting size of dwelling is the size of habitable area. Yet there is a strong linear relationship between both: very large rooms are available in villas, but in houses and apartments size is quite reasonable.

- The median sizes of rooms are as follows: living room 24 m²; guest room 24 m²; kitchen 15 m²; bedrooms 16-20 m²; toilet 4-6 m²; and utility areas about 23.5% of total dwelling area.

- Numbers of spaces are as follows: 1 living room; 2 guest rooms; 1 kitchen; 3-4 toilets; 3-4 bedrooms.

- Allocation of actual dwelling size is calculated and shown to be about 200 m³

- The most reflective of actual measures needed by residents for spaces were almost in the figures sourced from the apartment dwellings, but apartments are not the type of dwelling that satisfied most people.

- Villas show very wasteful measures in terms of consumption therefore such a form should not be the form of dwellings in Al-Madinah.

9. De-fragmentation of space within dwelling, neighbourhoods, and the city

De-fragmentation of space is to optimize the size to its adjustment satisfactory level in term of quality and quantity. Its quality is the type of dwelling, while quantity is the size of dwelling. Defragmentation is to avoid any wasteful spaces left between dwelling and neighbourhoods. It is to integrate individual spaces within the dwelling units, so that allocation of size of dwelling units with regard to both quality traditional forms, satisfaction levels and quantity with regard to satisfaction and actual contemporary measures, and necessary specification. It must fit with the economic characteristics of residents. The main findings of defragmentation chapter (9) are:

- Research concluded that the alternative to the dwellings in Al-Madinah is the proper type which is the house type. It shows how such dwellings with their compact sizes can satisfy socio-economic characteristics by reducing the cost of buildings from those shown in chapter two to about half to make it easy for households to own a plot and build an adequate home on it at affordable prices and with regard to socio-economic and cultural characteristics. This proposed dwelling, regarding the type and space syntax diagram is called the ‘Neo-traditional Madini House’.
The proposed designs here should not be taken as an optimum model with very fixed measures, but more to show that traditional concepts can be modernized with the same principals as those built based on the cultural values and norms of Islam as the religion that this city was established with. Other facades of traditional forms such as Mashrabiahs and arches may be examined by architects regarding whether they are needed as functional things or not, as they were in the past.

Accordingly, it is not only a suggestion that developers concur to the demands of the majority in Al-Madinah, but it is also an enabler policy for citizens to own the dwellings those they are residing as tenants or build what they are in need to. On the other hand, if such changes in policy make big savings in expenditure for the infrastructure, it will at least rearrange the spaces for better and more efficient use for the residents of Al-Madinah. Moreover, small plots, in informal areas appear as slum areas and are socially unacceptable for new generations but are very expensive in terms of their locations and distance to Prophet Holy Mosque and other services and amenities, but they are the most suitable sizes for future dwellings. Otherwise, major re-subdivision for most undeveloped planned plots should be considered especially in the villa zones.

De-fragmentation evaluates contemporary neighbourhoods qualitatively as attached subdivided plots, but detached dwellings and consequently segregated neighbours and fragmented developments. Moreover, informal districts are also fragmented, which are mostly within the holy zone and around mountains and valleys. Farmlands are also fragmented because of speculation for fast revenues of subdivision other than from agriculture.

Proposed neighbourhoods which are based on the proposed 'Neo-traditional Madini House' are regarded as a new model and the concept of 'Hoash' as an open space for neighbourly activities and yet, it has been called above the 'Neo-traditional Madinah Neighbourhood Unit' and assumed as a model to be applied in urban land as a flexible policy of neighbourhood planning.

Measures in the proposed model and shape are not fixed or strictly controlled but are flexible to fit with any urban pattern in Al-Madinah city. This adjustment of urban space is required because it reduces wasted spaces and assumes priority of development to that nearest the central zone and within the
holy zone. In contrast, it provides more usable spaces which are lacking in most contemporary neighbourhoods either in planned or informal areas.

- In quantitative dimension, the model has about 32 houses surrounding the semi private courtyard, providing a safe and secure space for children to play and elderly men to relax sitting and talking together.

- De-fragmentation of space in dwellings and then in the neighbourhoods, will de-fragment wasted spaces such as the undeveloped area in the city Holy Zone which should have the highest priority for development. The priority is because it is recommended by the Prophet not to go out of it or leave Al-Madinah.

- The de-fragmentation concept will increase the capacity of Al-Madinah to house with Neo-traditional measures 960,416 households in Neo-traditional houses and 5.8 million people which is more than three times it is now as shown in Chapter Nine

### 10.6 Conclusions of research

This research proposes a new methodology and applies it to an actual case study using the Islamic city of ‘Al-Madinah’ which has been the capital of the Islamic nation for fourteen centuries. The researcher concludes the following:

1. **Defragmentation and Urban Planning Knowledge**

   - Defragmentation of urban space is a research methodology that avoids the generalisation of decision making in city planning before examining the actual characteristics and needs of its households within dwellings and neighbourhoods. The researcher in city and town planning should avoid setting policies in accordance with their own decisions, but by using the defragmentation approach they may reach more accurate conclusions that fit the real needs and socio-economic characteristics of the city in question.

   - New developments in the field of urban planning, as well as other fields, should reflect the era of new technology and should not stick with traditional methods out of nostalgia. Notions and ideas change over time as technology advances, with constraints such as values, traditions, norms, and social and cultural knowledge. Such new ideas will enrich current knowledge with new methodologies and new routes for urban planning research and practice.
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- The research does not ignore current technological innovations and recommends old strategies and principles, but it suggests preserving cultural principles that have been sustained for centuries. The research further shows, despite imported unrelated policies and theories, the only principles that guide the morphology of built environment are cultural ones.

- The research is not a call for the return of ancient town and village life, but a call for real planning processes that deal with the actual needs of inhabitants and cultural issues behind any design consideration in the built environment.

- Defragmentation of space as a design approach adjusts space consumption not just by users, 'the public or households', but also by providers, 'landlords' and developers, and by planning authorities. It is the method that should be followed in designing rooms, dwellings, or neighbourhoods, and should be considered on a wider scale during any design process and whilst examining the profitability of such design in future developments. It should be used as guidance to ensure optimum consumption of urban space within the city boundaries to sustain natural spaces outside without being wasteful for future generations.

2. Defragmentation of Space and Al-Madinah as Model for Neo-Islamic City

- While Islamic traditional principles guide the traditional built environment, contemporary urban policies in Al-Madinah lead to vast transformations in neighbourhood planning. Local authorities and municipalities adopted Western models and applied them as the most common models. This generalisation was based on the assumption that all households have similar socio-economic characteristics. This consideration missed the real issues, and caused a delay in urban development and high expenditures in provision of infrastructure networks due to wasteful measures that do not fit with actual needs. However, guidance for future defragmentation of the built environment can be set by a revision of urban development policies every two decades, and neo-policies then should be adjusted to consider the real needs in terms of both building codes for dwelling units, or urban design codes for neighbourhood units.

- Great efforts have been made by a few urban designers in Saudi, but most lack historical precedent for such models in relation to local cultural issues and actual needs. On the other hand, Western urbanism theories may suit their own countries but they should not be adopted and generalized all over Saudi. The locality of urban design
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should be innovated by local architects, planners, urban designers, and involve public participation before setting any policy or regulations. Such policies will be informed by local identity and be sensitive to citizens and their culture.

- If defragmentation had been adopted and applied in Al-Madinah, huge numbers of the population could benefit from living inside the holy area, which in Islamic faith is beneficial because each prayer inside the holy area is 1,000 times greater than that of one outside.

- Adoption of neo-traditional dwellings will reflect local identity only if architects do not dictate their views of design over the owners, ‘dwellers’. They should reflect their real needs and the socio-cultural values they respect and hold.

- Most Saudi consultant offices who deal with dwelling design or subdivision employ non-Saudi staff because they cost less and because of a shortage of experience amongst Saudis. This issue is very important to consider because those non-Saudi or ‘non-Madini’ will not reflect the local identity in the design of dwelling or land subdivision they deal with. Consultant offices should pay more for new graduate Saudi architects and planners, and these new graduates should expect less because they have less experience. The real benefit to them at this stage of their career is the experience of practicing professional architecture, planning and urban design.

- The adoption of neo-traditional neighbourhoods will reflect the local identity of Al-Madinah if the Municipality incorporates public participation in the decision making process and in development as participants in decision making.

- Training courses for local identity and Islamic architecture should be provided for architects, planners, urban designers, and non-Saudi staff who work in consultant offices to educate them.

- Lectures and advice on neighbouring should be given, especially in Mosques to strengthen the relationships between neighbours. This could lead to greater community cohesion and consequently increase people’s sense of responsibility to their neighbourhoods and neighbours.

- Competitions can be used as a means of engaging the community in their neighbourhoods. For example, competitions to find the cleanest neighbourhoods, the most beautiful landscape, and best urban design. All age groups and genders should be encouraged to participate either by mosques or by schools to increase the knowledge of locality, neighbourhood, neighbouring, urban form, and cultural
identity. Such participation can only be gained in the 21st century by using the merits of information technology. Nevertheless, cooperation is required from all municipal authorities, agencies, infrastructures organizations, companies, private sectors, services sectors, and the public.


- Al-Madinah had the first 'Urban Observatory'. It is a new institute that was established and controlled mainly by the Al-Madinah Municipality in 2005. The observatory is concerned with the cooperative role between Government authorities; infrastructure organizations; private sectors; and the public when setting comprehensive development socio-economic plans, indicators and information about housing policies. Such new policies aim to adjust local measures2, and identity based on its local needs and culture, which is what has been attempted in this research, and called defragmentation. An urban observatory should be a knowledge-based urban planning centre that encourages cooperation between all stakeholders such as Governmental, private, consultants, research centres, and census databases to make decisions more accurately and more fitting with the real needs and demands of the inhabitants in term of infrastructure, services, utilities, and residential land.

- Despite the current advanced efforts of Al-Madinah compared to other Saudi cities in terms of information technology, especially with the projects of E-Governments, and Urban Observatory, there is a need for an improvement of information technology skills for all planners, architects, urban designers and others who deal with urban planning. Such skills are the tools of neo-traditional planning in the age of knowledge cities. GIS SPSS and space syntax are the most needed in such studies of city planning for better analysis, and consequently yield more accurate results.

- Census data are very important for urban planning in order to adjust and update urban codes with regard to contemporary socio-economic data. Census data should be integrated with GIS database maps to categorize neighbourhoods and consequently allocate the required amenities and services with regard to demographic references.

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2 The call of 'sustainable development for human settlements' by UN, World Band in Habitat 2nd Agenda Sourced from www.albenaamagazine.com.sa/issue/Record/Iss/168-169/medina/meeting.htm
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- It is also very important for the efficiency of any proposed business to consider the type and size of its trade and future success. For example in Saudi Arabia, if a neighbourhood is mostly occupied by single people then restaurants are more common than bookshops in a newly developed neighbourhood.

- Public participation is part of contemporary planning, and yet it is not only the duty of the Municipality and housing sectors. Integration between all sectors such as education, health, infrastructure, information authority, social services, police, agriculture, and the public is necessary to develop neighbourhoods incrementally; to build the relationship between residents and their neighbourhood. For example, in a newly developed school, children may learn how to plant a tree in science at primary level. This can be done practically in his/her neighbourhood and because he or she can irrigate the tree continuously, he or she will be more informed about and responsible for the landscape of the neighbourhood. This promotes the feeling that each person has a responsibility for where they live. This is a very difficult task for publics when the tree is left to be the responsibility of Municipalities, when no one can interfere in irrigation of other task of landscaping.

- Participation can be incorporated into planning systems with the e-government projects that provide electronic services, and receive any recommendations and claims for the development of neighbourhoods electronically. A neighbourhood representative can be a good way of achieving this goal and he/she can receive people's thoughts, proposals, claims, problems, or any new event that occurs in their neighbourhood for the Municipality to cope with. All communication can be done electronically by email or message service to the Municipality centre; this requires increasing public knowledge of information technology and how they can participate. Such goals can be achieved through short training, like that run by the Centre of Society Service in Al-Madinah and Trade Authority. Their task is to increase public knowledge through more active participation in terms of local development at neighbourhood and city level.

- More activities can be enhanced locally between neighbourhoods by electronic announcements and diary of events, such as real and virtual (electronic games) football tournaments. This might encourage good relations between children's groups at primary, intermediate, and secondary levels. Such activities can also be used for strengthening relationships between neighbours, and for data updating by teams' leaders and neighbourhoods captains.
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- A knowledge-based urban planning centre cannot be complete without a college for Islamic Architecture and Planning. However there is a need in Al-Madinah to establish such a college in Taibah University to be the main partner with the Municipality. Otherwise, training courses are needed for practitioners such as planners, architects, urban designers, draftsmen, and staff who work in consultant offices. Cooperation between all institutional bodies, Governmental and non Governmental organizations, the public, consultants, research centres, universities, training centres, can lead to sustainable development for Al-Madinah.

4. Defragmentation and Sustainable Development in Knowledge City

- In the case of adoption and application of defragmentation models for neo-traditional dwellings and neo-traditional neighbourhoods as shown in Chapter 9, huge areas of urban space can be saved outside city boundaries which can be used for farming, the second main economic activity in Al-Madinah. This activity can provide more jobs for unemployed adults of both genders.

- Some training is required for this type of activity, especially from traditional farmers whose numbers are very small now, and through consultation with the Agriculture Bank, and branch of Agriculture Ministry in Al-Madinah. There is an urgent need to establish an Agriculture College in Taibah University in Al-Madinah to sustain farming and farm lands, and to create new jobs for future generations.

- The natural topography of Al-Madinah was characterized with small mountains which have been demolished during central developments. Such topography characterized the urban form and contributed to the unique identity of Al-Madinah at that time. However, future subdivision plans should consider the conservation of topography during land subdivision to sustain such natural elements for traditional form of buildings through stairs up and down via routes.

- The holy status of Al-Madinah should be sustained as religious tourism is the main economic activity for Al-Madinah. Historical mosques, buildings, castles, and walls should be preserved and, if they do not exist, should be built in some areas to show their possible locations and past importance. Such activity will energize economic business such as trade, transport, and accommodation, and consequently more jobs will be created.
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- Towns and villages within the region of Al-Madinah should undergo urban regeneration as more jobs should be created for the coming generations; otherwise overpopulation will lead to a decline of Al-Madinah.

- Balanced developments should continue over regions, cities, towns, villages and neighbourhoods within. Moreover, access for knowledge should be equal for everyone. Information systems should be taught in early schooling, as adopted in Saudi, and schools in towns and villages should have suitable infrastructure for IT education. The Internet should be accessed from any village or school, and those who are not in school should have library or internet cafe access.

5. Knowledge City and Economy

- Information Technology and innovation should upgrade planning goals and objectives. It should achieve better economic development in terms of planning decisions that will be knowledge-based and analysed and all services, amenities, and utilities are adjusted to actual needs without wasteful expenditure either on governmental level or in households.

- Governmental saving should upgrade the quality of services and amenities, and should be distributed to neighbourhoods most in need.

- On the other hand, household’s savings should fund the private development of housing and small projects.

- Moreover, this process will do more for business like local builders and contractors and consequently electricians, plumbers, and retailers of steel, cement, and other building materials.

- Once demand in these areas has increased, salaries will consequently rise. Therefore, those who graduated from the Industrial Institute in Al-Madinah and had no job or were not interested in practicing because of low salaries will be encouraged to do so.

- The cycle will then spread over the city, and once such workers incomes have increased their quality of life will improve, especially for the coming generations in terms of affording the technology they need for 21st century education systems.

- Work will lead to psychological well being, and anger will be reduced if people have enough time for rest and relaxation. The majority of petty crime is committed by
the unemployed or teenagers who don’t work, and who do not have enough money to spend. Therefore, economic development leads to social stability.

5. How the Knowledge City and Social Development Lead to a Peaceful Neighbourhood

- Urban and economic developments are not enough to instigate social development. The culture of urban life and social values, morals, attitudes, traditions, and religion within culture are factors which influence social behaviour. If teenage children have the amenities they need, and adults have jobs and a stable income, and all have good morals, values, and have been educated in the basic peaceful principles of Islam they will do no harm. If all neighbours know their rights and responsibilities as Islam recommends there will not be any problems between neighbours. If there are neither problems nor crime within neighbourhoods, these neighbourhoods will be peaceful places to live in.

- Planners, economists, sociologists, politicians, the public, and all stakeholders of city development should work to achieve knowledge cities with pleasant neighbourhoods and happy households.

- The idea of ‘neighbouring’ should apply not only within cities but also between countries to achieve regional economic development for sustainable development in the Gulf.

10.7 Future recommendations and research

There are a few future recommendations that researchers and planners may take into account. To avoid generalization of any results, findings are based on specific cases studies, and to create local identity or traditional urban form in terms of dwellings and neighbourhoods in each city or region.

- For architects, urban planners and designers working either for developers or in governmental agencies such as municipalities, infrastructure sectors and services, this would be an Islamic Model based on entries from Al-Madinah residents in 2001 empirical field work and satisfaction analyses of the size of dwellings. Based on the linear relationships between the number of houses and areas of courtyard in Old Madinah and its ‘Ahwash’, the Hoash which is the area of courtyard or semi private open space between dwellings, both variables are
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assumed between areas of dwellings and areas of courtyard. But in the case of
the three patterns of contemporary built environment and with digital maps, the
size of the block can be allocated to be a model of Neotraditional Madinah
Neighbourhood Unit.

• Change is a natural process in every urban issue, and also in shape and
materials. Contemporary building materials may affect the shapes of building.
The need is to be investigated in regard to transformation of traditional
architectural style and effects of buildings materials in change of local identity
in cities.

• Singles those who live in Saudi cities lack adequate dwellings, because it is
culturally not acceptable for singles to reside in new residential areas, or in a
high-rise building where families live. Yet, it is better to investigate the housing
needs of singles in Saudi cities, especially large cities such as Ar-Riyadh,
Jeddah, Makkah, Al-Madinah where there are international labours, students in
universities and other educational institutes. Such singles are higher in large
cities than in other towns and villages, and yet, more researches are needed with
Islamic principals to satisfy their needs.

• Census data is very useful. It is integrated with the Urban Information System
and used by planners in each city for better planning tasks including urban tasks.
Bureaucracy and putting data on shelves and strictly the use is not the way for
development of societies. Some decision makers may hold from publics, and
researchers and thought that more control over will upgrade his status. But on
the others hand those who help offer more accessibility for data either public or
researcher helps in developments. Yet, better integration of governmental and
private and public sectors will lead to better planning, social built environments
and a peaceful life.

• Information technologies can cost a lot in adoption, training, data collection, and
professional consultations, but they save more in the long term, with regard to
better decisions, and advanced solutions can be found if they are sued and
shared between all parties within national and local goals and objectives.
Moreover, they may cost more if they are not installed and installed but not been
used adequately. The E-government project in Al-Madinah is an example of a
good, potentially promising virtual space to form the space for sharing the
Chapter Ten: Conclusions

decision making, not only to follow applications in municipality, but also to access civic services.

- Space syntax is used in research in terms of morphology of spaces within traditional and contemporary dwellings and clusters of buildings. But, it is not used in evaluating the whole old city of Al-Madinah. As this is an empirical job to do, it may a good direction for further studies.
Appendix of Chapter Three:

Figure (2.11): Map of Al-Madinah Districts, 83 districts including the ‘CBD’, and three main mountain’s zones (11, 83, and 84)

Adapted from (http://www.amana-md.gov.sa/Madinaexp/), and manipulated by author

The map shows the vast urban developments and where within three decades Al-Madinah extended from the area of central zone (CBD) in the map, to the whole urban areas. The area of smallest districts shown above is almost the same area of Al-Madinah old city. It seems not only the city that been inflated, but also the compact neighbourhoods to large districts.
Table (3.7): Names and Number of Al-Madinah Districts, Names are shown in both Arabic and English for pronunciations purpose.

Adapted from (http://www.amana-md.gov.sa/Madinaexp/), and manipulated by author

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</table>
Questionnaire

Please tick only one in each question only one box [ ], or fill the space (…….)

A) Personal Data:

Q1 Name: _____________________________

Q2 Nationality: □ Saudi □ Non-Saudi

Q3 Marital Status:
□ Single □ Married □ Widow or divorced

Q4 Occupation:
□ Self-employed □ Employed □ Unemployed
□ Retired □ Student □ Other? {..................}

Q5 Educational status (depend on certificate you hold):
□ Can not read or write □ Read and write
□ Primary □ Intermediate or equivalent
□ Secondary or equivalent □ Undergraduate or equivalent
□ Diploma/ postgraduate or equivalent

Q6 Size of household who live here, please specify (…) family (…) person

Q7 How many of the following are living with you in this house/ flat?
□ Servant □ Driver □ Relative (……………..)

Q8 Is your partner employed: □ Yes □ No

Q9 Total Monthly Income:
□ < 1000 SR □ 1001-2000 SR □ 2001-3000 SR
□ 3001-4500 SR □ 4501-6000 SR □ 6001-8000 SR
□ 8001-10000 SR □ More than 10000 SR

Q10 Do you have this plot of land or any one elsewhere □ Yes □ No

Q11 Where does it locate? Specify (District of; ……………………..)

Q12 How did you get it?
□ Bought □ Granted (pension)
□ Inherited □ Others (specify) (……………..)

Q13 Please specify the following:

Y.NEYAZI
Appendixes

a) Area (…… m²)  
b) Dimensions (Frontage)…… m. X (depth)…… m.
Q14 How much is the size of the street width? (…… m²)

B) Municipal affairs and building regulations
Q1 Have you had a building permit for building or an application? If not please skip to part C.
Q2 What ratio of building are you allowed to build? Specify (……%)
Q3 What ratio you are looking for? (……%)
Q4 How many floors are you allowed for building? (……floors)
Q5 What number you are looking for? (……floors)

Q6 How many rooms you need? (…… rooms)

Q7 How many toilets do you need?

Q8 How much time did permission take? (…… weeks /months)

Q9 How many times have you contact with related departments? (……times)
Q10 During the permission’s procedures, what departments did you contact with? Please specify the number of times you did in the square left:

- [ ] Minor municipality
- [ ] Surveying dept.
- [ ] Planning dept.
- [ ] Urban Planning Manager’s office
- [ ] Finance dept.
- [ ] Major municipality
- [ ] Consultant office
- [ ] Permission dept.
- [ ] Mayor Office
- [ ] Others (………………)

Financial affairs
Q11 How much is the total cost of construction for this residential unit? (……..SR)
Q12 Is it funded by any other banks or? If not please skip to part C.
Q13 Please specify the loan source from the following:

- [1] Real Estate Development Fund
- [3] Housing Project’s Investors
- [4] others (………………)
Q14 What is the total amount of loan? (…………..SR)
Q15 In the case the loan is from banks, what is the interest rate? (…….%)
Q16 How you pay back the loan? [ ] Monthly [ ] Annually
Appendixes

Q17 For how many years you the loan should be completed? 
(...... years)

Q18 Do you pay it regularly? Yes, or

Q19 If not specify why from the following:

1. Can’t pay it, payment are high amount to my income.
2. Don’t want pay it, (..........................................................)
3. Others, (..........................................................)

C) Housing Characteristics:

Q1 How long did you live in this house/flat? (.....) Months (.....) years

Q2 Is the house

1. Owned by you or your father/ relative?  
2. Private rented?
3. Public/Governmental rented?  
4. Employer rented?

Q3 Value of annual rent 
(..........) SR

Q4 Type of the residential unit:

1. Flat  2. Local house  3. Villa

Q5 How much is the actual cost of furnishing this unit?

1. Up to 5000  2. up to 10000 SR  3. up to 20000 SR
4. up to 30000 SR  5. up to 50000 SR  6. up to 75000 SR
7. up to 100000 SR  8. up to 150000 SR  9. more than 150000 SR

Q6 Number of frontages: 
(...)

Q7 Type of neighbouring:

1. Detached  2. Semi-detached  3. Attached
4. Flat in multi-floors building  5. Addition

Q8 Material of construction:

1. Brick (local)  2. Concrete and cement brick
3. Concrete and brown brick  3. Others? Specify (..........)

Q9 Areas (please indicate the dimensions in estimation and numbers if they exist):

- **The plot**  
  \( (\text{m}) \times (\text{m}) \)  
  (...........) \( \text{M}^2 \)  
  No: (....)

- **The whole unit**  
  \( (\text{m}) \times (\text{m}) \)  
  (...........) \( \text{M}^2 \)  
  No: (....)

- **Living room**  
  \( (\text{m}) \times (\text{m}) \)  
  (...........) \( \text{M}^2 \)  
  No: (....)

- **The kitchen**  
  \( (\text{m}) \times (\text{m}) \)  
  (...........) \( \text{M}^2 \)  
  No: (....)
Appendixes

Toilet \((m) \times (m)\) \((......)\) M² No: (...)  
Bed room \((m) \times (m)\) \((......)\) M² No: (...)  
Guest room \((m) \times (m)\) \((......)\) M² No: (...)  
Court-yard \((m) \times (m)\) \((......)\) M² No: (...)  
Roof floor \((m) \times (m)\) \((......)\) M²  
Parking (Garage) \((m) \times (m)\) \((......)\) M² No: (...)  

Q10 As a resident in this home, how satisfied are you with the following aspects:

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<th>Please tick one box</th>
<th>Very satisfied</th>
<th>Fairly satisfied</th>
<th>Neutral</th>
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<td>Internal characteristics</td>
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<td>2. Layout of the rooms</td>
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<td>3. Sizes of rooms</td>
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<td>4. Size of living room</td>
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<td>5. Number of bathrooms</td>
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<td>6. Size of guest room</td>
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<td>7. Number of guest rooms</td>
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<td>8. Size of the kitchen</td>
<td>1  2  3  4  5</td>
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<td>9. Number of windows</td>
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<td>10. Building’s materials</td>
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<td>11. Size of courtyard</td>
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<td>12. Layout of courtyard</td>
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**Exterior characteristics:**

| Building’s layout | 1  2  3  4  5 |                  |         |                     |                  |
| Building’s structure | 1  2  3  4  5 |                  |         |                     |                  |
| Building’s height  | 1   2   3   4   5 |                  |         |                     |                  |
### Appendixes

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#### Environmental characteristics

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<td>4</td>
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<td>4</td>
<td>5</td>
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Q11 Where do you park your vehicle?

- **1** Private parking (garage)
- **2** Parking on the street
- **3** Parking area off the street
- **4** On vacant land

### D) Neighbourhood location and accessibility:

*Q1 As a resident in this neighbourhood, how satisfied are you with the following aspects considering the distances which are shown near the squares:*
Appendixes

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Q2 As a resident in this neighbourhood, how satisfied are you with access to the following aspects:

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Infrastructure, services and public facilities

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**Please tick one box**

*for each aspect*

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<th>Very dissatisfied</th>
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### Roads, parking and pedestrian walk-ways

| 69. Roads size | 1 | 2 | 3 | 4 | 5 |
| 70. Roads layout | 1 | 2 | 3 | 4 | 5 |
| 71. Roads safety | 1 | 2 | 3 | 4 | 5 |
| 72. Roads pavement | 1 | 2 | 3 | 4 | 5 |
| 73. Parking adequacy | 1 | 2 | 3 | 4 | 5 |
| 74. Parking shading | 1 | 2 | 3 | 4 | 5 |
| 75. Pedestrian walk ways | 1 | 2 | 3 | 4 | 5 |

### E) Economical aspects

| 76. Value of land | 1 | 2 | 3 | 4 | 5 |
| 77. Cost of construction | 1 | 2 | 3 | 4 | 5 |
| 78. Renting cost | 1 | 2 | 3 | 4 | 5 |
| 79. Services cost | 1 | 2 | 3 | 4 | 5 |
| 80. Transport cost | 1 | 2 | 3 | 4 | 5 |
| 81. Furniture costs | 1 | 2 | 3 | 4 | 5 |
| 82. Loan availability | 1 | 2 | 3 | 4 | 5 |
| 83. First payment | 1 | 2 | 3 | 4 | 5 |
| 84. Monthly payment | 1 | 2 | 3 | 4 | 5 |
| 85. Bank’s loans | 1 | 2 | 3 | 4 | 5 |
| 86. Interest rates | 1 | 2 | 3 | 4 | 5 |
| 87. Loan’s terms | 1 | 2 | 3 | 4 | 5 |
| 88. Loan’s time | 1 | 2 | 3 | 4 | 5 |
Appendixes

Please tick one box for each aspect

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Q2 This area is for your comments, please feel free to do so within the allowed space:

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Thank you very much for your co-operation.

Y.NEYAZI
Appendix of Chapter Nine:

Planned areas: sample no: 1 Total area of sample.
Planned areas: sample no. 1, total areas of inner residential blocks

Planned areas: sample no. 2, total area of sample
Planned areas: sample no. 2, total areas of inner residential blocks

Planned areas: sample no. 3, total area of sample
Planned areas: sample no. 3, total areas of inner residential blocks

Planned areas: sample no. 4, total areas of inner residential blocks
Planned areas sample no 4: total area of sample

Planned areas: sample no. 5, total area of sample
Planned areas: sample no. 5, total areas of inner residential blocks

Planned areas: sample no 6, total area of sample
Planned areas: sample no. 6, total areas of inner residential blocks

Informal areas: sample no. 1, total area of sample
Informal areas: sample no. 1, total areas of inner residential blocks

Informal areas: sample no 2, total area of sample
Appendixes

Informal areas: sample no. 2, total areas of inner residential blocks

Informal areas: sample no. 3, total area of sample
Planned areas: sample no. 3, total areas of inner residential blocks
Informal areas: sample no. 4, total area of sample

Planned areas: sample no. 4, total areas of inner residential blocks
Informal areas: sample no 5, total area of sample

Planned areas: sample no. 5, total areas of inner residential blocks
Bibliography

Using

EndNote X
Bibliography:


Bibliography


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Bibliography


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