URBAN MORPHOLOGY, OPEN SPACE PLANNING AND ANALYSIS TOOLS: FORT WORTH SINCE THE 1909 KESSLER PLAN

by

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ABSTRACT

URBAN MORPHOLOGY, OPEN SPACE PLANNING AND ANALYSIS TOOLS:

FORT WORTH SINCE 1909 KESSLER PLAN

by

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The University of Texas at Arlington, 2013

Supervising Professor: Pat D. Taylor, Ph.D.

This thesis focuses on the relationship between the parks system and city growth patterns in Fort Worth, Texas. It describes the evolution of the city's parks as well as the city's urban morphology since the inception of 1909 Kessler city park plan.

Throughout Fort Worth's history, open space planning has played a key role in the city's development policies (City of Fort Worth Planning and Development Department 2004). Kessler's 1909 original park plan for the City of Fort Worth still serves as the basis for major park facilities (City of Fort Worth 2012). Evolution of the parks system in Fort Worth demonstrates the value of implementing plans for city development over time. The thesis illustrates how a plan that is over a century old can influence the patterns of community growth and how the plan is accomplished.

Urban morphology is "a study of city as human habitat" (Moudon 1997 p.3). In this research it refers to the shape and forms of Fort Worth over time. By comparing the parks shape and the urban morphology of Fort Worth, the study demonstrates how Fort Worth has integrated and relied on its park plans since 1909 Kessler plan. This study verifies how the Kessler plan has helped to protect the city's natural resources and it has influenced the city's

shape over time.

Qualitative research methods were used for this study because the research questions require information about how people think and act regarding policies followed by the city (Taylor and Bogdan 1985). Interviews were conducted with individuals involved in the city's Department of Planning and Development, and Department of Parks and Community Services as well as firms that has provided planning and design for Fort Worth. Transcripts of the interviews provided a narrative for analysis in this thesis. Graphic Information Systems (GIS) was used as a tool to create maps and provide a mode for analysis.

In conclusion, this thesis presents the evolution of the parks system as well as the influence on the urban morphology in the city of Fort Worth based on Kessler's plan. It also discusses how Fort Worth has integrated and protected this plan, which is being used as direction for the immediate future.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLE

CHAPTER 1

INTRODUCTION

This chapter presents a brief history of the development of Fort Worth's parks system and introduces the concept of "urban morphology" and its development in Fort Worth. This chapter also discusses research questions, problem statements, definitions of key terms, and research methods.

Urban morphology is "a study of city as human habitats" (Moudon 1997 p.4). It studies the formation of human settlements and the transformation and formation of the forms (Moudon 1997). It not only deals with the physical shape and form of the city but also implements history and culture as well. In this thesis, they study of urban morphology is based on the research of the shapes and form of Fort Worth. It also illustrates how urban morphology relates to the parks' plan and how it is influenced by the parks' plan.

1.1 A Brief History of Fort Worth Parks

From a lonely outpost on the Trinity River little more than a century ago, Fort Worth has evolved into its current state as a result of the actions and influence of individuals and historic events (Fort Worth National Bank 1965). Originally, the facilities adjoining the trails were perceived as support for the trail itself but they have become more important over time as the trails dissipated. Ultimately this changing importance contributed to Fort Worth's becoming a unique and competitive city based on its well-preserved parks system.

1.1.1 Early Years

Driving cattle across Texas to Kansas from 1866 to 1884 on the Chisholm Trail stimulated the early growth of Fort Worth (Fort Worth National Bank 1965). During this time parks were used as anchors at the ends of transit lines to ensure ridership of the cattle trail system (City of Fort Worth Planning and Development Department 2004).

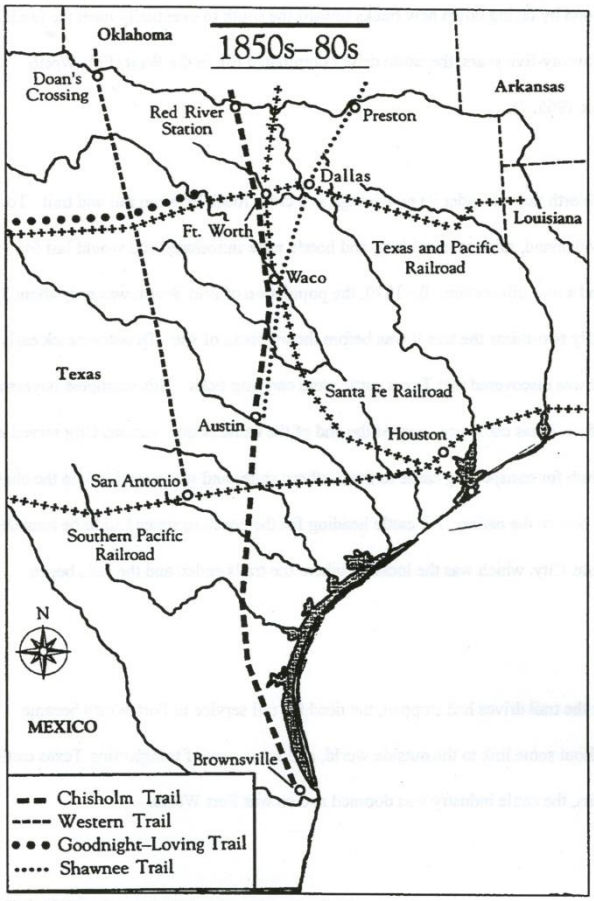


Figure 1.1 Texas Cattle trails of 1850's-80's (Knight Oliver 1990)

In 1909, George Kessler was invited to develop a master plan for the city's parks system. During this time, numerous parks were created. These parks not only helped to identify the natural resources of the community but also shaped the open space in the core area of Fort Worth.

Many of Kessler's concepts have been preserved, for instance the idea of using the parks system to link different parts of the city and creating neighborhood parks based on citizens' needs (City of Fort Worth 2012). The advantages of parks are well recognized; for example, as data gathered in this research suggests, the 1957 Fort Worth city plan explains how parks help to protect the natural scenery and development of landscapes, how they

influence development of the land that is not suitable for living, and how they provide recreational opportunities for citizens within a reasonable distance (Hare and Hare 1957).

At the beginning of the 1920s, Fort Worth's growth primarily spread to the north and south, guided largely by the streetcar system (Fort Worth National Bank 1965). With the start of World War II, the economic depression came to an end, and the city experienced great growth due to the increasing population and the recovery of the economy. As the population increased, the city expanded bringing greater opportunities and the needs for parks. "In 1927, the Recreation Building was constructed to serve as the administrative headquarters for the Parks and Recreation Department" (Kline 2010 p.37). A new master plan for the parks system had been completed in 1930 by Hare and Hare, a landscape firm in Kansas City.

1.1.2 Postwar Boom

In the 1950s, the city's boundary continued to expand at a tremendous speed. A new highway system "separated the older areas from the downtown core and much of Fort Worth's commercial development that has occurred since the 1960s was orientated along these highway corridors" (LRK 2003 p.12). These activities promoted the development of open space. Also, at this time, public power became important in the development of the parks system. Partnerships began with individuals, nonprofits, private foundations, federal and state agencies, as well as other organizations (Kline 2010).

In 1996, the parks and recreation department won the prestigious National Gold Medal Award from the Sports Foundation, Inc. for excellence in the field of parks and recreation management (Kline 2010). All these improvements in the parks system demonstrated the city's attitudes toward the implementation of Kessler's idea in Fort Worth. The well-preserved parks system in Fort Worth today is the results of the efforts of several generations. This parks system is influenced by the shape of Fort Worth's natural resources and contributes to the city's shape and forms during these years.

(a)

(b)

Figure 1.2 (a) Japanese Garden in Botanic Garden (b) Fort Worth Stockyard (Dandan 2011)

1.1.3 New Century

The creation of new parks, as well as the improvement of existing parks and playgrounds, remains a main issue for the development of the parks system in Fort Worth into the 21th century (City of Fort Worth 2012). The Parks and Community Services Department remains committed to the preservation of green space and the creation of recreational opportunities for its citizens (Kline 2010). In fact, the mission for the Parks and Community Services Department is "to enrich the citizens' lives through the stewardship of resources and the responsive provision of quality recreational opportunities and community services" (City of Fort Worth 2012).

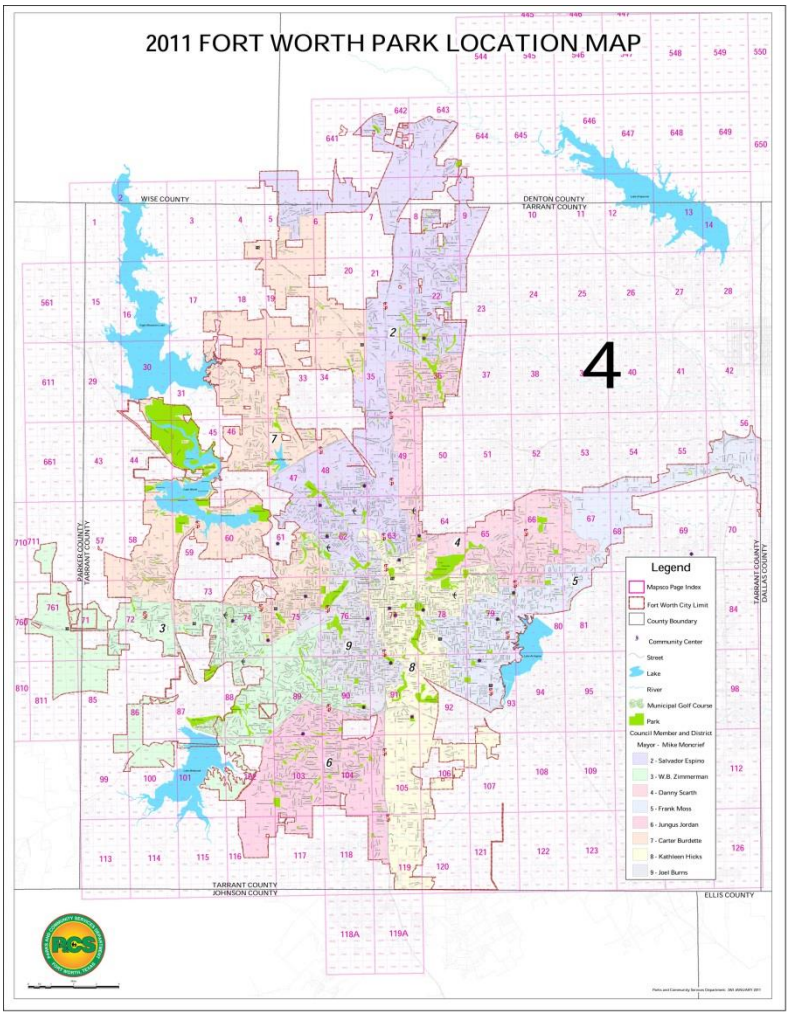


Figure 1.3 2011 Fort Worth Park Location Map (City of Fort Worth 2011)

1.2 Research Statement

The quality and character of all cities are dependent on a plan (Friedberg 2004). Preliminary discussions and early literature reviews suggest that Kessler's 1909 park plan for Fort Worth has influenced the city's morphology for over one hundred years. This study searches for evidence of an enduring influence of a plan on a major American city's shape and form.

Fort Worth seeks to balance the development of modern urban forms while protecting its historic resources. To do this, it is involved in new developments, providing incentives for the rehabilitation of historic natural properties. As a city with a rich as well as unique culture and history, Fort Worth has been focused on maintaining a preserved parks system based on the city's first plan by Kessler in 1909.

1.3 Research Purpose

The purpose of this research is:

- To explore the relationship between urban morphology and parks by reviewing parks plans in Fort Worth since the 1909 Kessler plan
- To review how Fort Worth has integrated and relied on the Kessler plan over time
- To reflect on the city's future morphology by comparing and contrasting early plans including park plans and city plans

1.4 Research Questions

The research questions explored in this thesis are:

1. What are the relationships between urban morphology and the parks system in Fort Worth?
2. How did the city's shape and form develop in Fort Worth?
3. How has Fort Worth integrated and relied on the Kessler plan over time?

1.5 Research Methods

This research is based on qualitative research methods because it emphasizes linguistic data rather than numerical data (Lincoln and Guba 1985). Historic documents and maps are collected from Planning and Development Department, Parks and Community Services Department and interviewees. GIS are introduced into this research to provide maps of different eras and provide quantitative data of spatial structures. Interviews with people from professional groups are conducted as well. Their experience and knowledge contribute to the analysis of the study. The "Plan Analysis" (Conzen 1981 p.24) based on the historic maps starting from the 1909 Kessler plan is going to be conducted as well.

1.6 Definitions of Key Terms

Open Space: The land and water in an urban area not covered by cars or buildings, or any undeveloped land in an urban area. Tankel suggested that open space is not only the elements mentioned above but is also the space and the light above the land (Woolley 2003).

Urban Morphology: "It is the study of the city as human habitat. Ethnographer Levi-Strauss described the city as 'the most complex of human inventions...at the confluence of nature and artifact. Urban morphologists concur: They analyze a city's evolution from its formative years to its subsequent transformations, identifying and dissecting its various components" (Moudon 1997 p.3).

International Seminar on Urban Form (ISUF): "In the summer of 1996, a group of urban morphologists from a variety of disciplines including architecture, geography, history, and planning, formalized the International Seminar on Urban Form. The meetings confirmed that several generations of scholars had been active in urban morphology, not only in England, but also in Italy and in France, and that many individual researchers from a variety of other countries were contributing to the field" (Moudon 1997 p.4).

Urban Fabric: "The physical aspect of urbanism, emphasizing building types, thoroughfares, open space, frontages, and streetscapes but excluding environmental, functional, economic and sociocultural aspects" (Moudon, 1997).

Kessler 1909 Park Plan: A park plan for Fort Worth done by George Kessler (urban planner / landscape architect) in 1909.

National Register of Historic Places: "The National Register of Historic Places is the official list of the nation's historic places worthy of preservation. Authorized by the National Historic Preservation Act of 1966, the National Parks Service's National Register of Historic Places is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archaeological resources" (http://www.nps.gov/nr/ 2012).

1.7 Significance and Limitations

The significance of this research is:

- A better understanding of the evolution of the park system in Fort Worth for landscape architects, planners and experts
- A demonstration of long term influence of the Kessler plan on Fort Worth

The limitations of this research are:

- The history of Fort Worth prior to Kessler 1909 park plan
- Limited historic data available

1.8 Summary

Fort Worth's parks system contributes to the city's historic texture, which also represents the city's character. This chapter presents a brief history of the evolution of the parks system in Fort Worth since the 1909 Kessler plan. It also discusses the importance of the parks system to the development of urban morphology in Fort Worth.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of literature that discusses the major aspects related to the urban morphology in Fort Worth:

- Urban morphology theory
- The relationship between open space and urban morphology
- A relatively short history of Fort Worth parks and Fort Worth's city and park plans

Section 2.2 introduces landscape architecture and urban morphology in literature. Section 2.3 mainly discusses the development of urban morphology theory and "Conzenian" theory. This theory contributes to the town plan analysis of Newcastle (Conzen 1981). This approach explores the continuing changes between past and future urban forms by the built and social environment created by culture, social organization, and political precedents (Whitehand and Gu 2007). Section 2.4 presents the growth of Fort Worth's city shape and forms over time.

2.2 Landscape Architecture and Urban Morphology

2.2.1 Introduction

The natural landscape provides the foundation on which the city has been shaped. It shapes the city and highlights the local natural features. Conversely, a landscape shaped without sensitivity to nature is ineffective because it cannot provide people a sense of place. Establishing a past with an eye toward preservation provides groundwork for future planning.

City plan should not be restricted to individual buildings but rather should incorporate the design of open spaces such as streets, plazas, parks, rivers, and so on (Friedberg 2004). These open spaces have been designed over time, like architecture, the best pieces of

landscape art and design are important not just as contemporary places in which to live, but also represent history and culture (Friedberg 2004).

M. Paul Friedberg in his paper, “Then and Now,” suggested that the city should be (Friedberg 2004 p.31):

- *“A sculpture park freeing art from the museums, allowing to live with - and not make pilgrimages to - the art*
- *The arboretum, people can live with plants as the botanical counterparts, not as captives in planters*
- *Streets recast as pedestrian zones free of conflicts with automobiles”*

2.2.2 Existing Situation and Threats

It has been recognized that landscapes are dynamic processes, unlike architecture that can be stable for hundreds of years. Nowadays, people begin to realize the significance and necessity of preserving natural resources such as air, water, land, and biological species (Friedberg 2004). Restoration of watersheds, river systems, and forest habitats are recognized as significant for the natural networks (Friedberg 2004). Parks, open space, and recreational opportunities not only enhance the quality of life and neighborhood vitality, but also preserve natural resources, and provide alternative links between neighborhoods and growth centers (City of Fort Worth 2012).

Since World War II, significant developments modifying the urban landscapes have come under attack by civic agencies and developers (Levy 1999). Landmark buildings, plazas, and parks are being destroyed to accommodate larger developments (Levy 1999). Lands set aside for open space are particularly vulnerable and are often sacrificed for freeways or commercial areas (Friedberg 2004).

The argument for acquiescing to demolition is often based simply on the fact that change is inevitable (Hall 2000). People have no choice but to put up with it (Hall 2000). Because of this viewpoint, designed open spaces have been sacrificed for what is perceived to

be more “practical and needed” facilities such as freeways, buildings and so on (Friedberg 2004 p.31).

Natural resources in the city provide unique opportunity for the development of urban landscapes. The strong influence of urban landscapes can be seen in the arrangement of urban networks and the upgrades in certain cities (Whitehand and Gu 2007). Even when some of the sites are not used for their original purposes, the memory, or the sense of these places, still exists. This sense of place blends the physical features and the landscape people live in with experiences and memories (Fitch 1982).

2.3 Urban Morphology

The formation of the urban morphology in Fort Worth is generated by the physical and social conditions represented in North Texas over the past one hundred years. Recognizing landscape as a cultural, educational, intellectual, and economic resource helps to understand how individual features are connected historically and geographically; that is, how they fit into the wider urbanism (Whitehand and Gu 2007).

Urban morphology, the “study of the city as human habitat” (Moudon 1997 p.3), was deeply rooted in German geographers and became popular at the end of the 19th century (Moudon 1997). In the English-speaking world, urban morphology has a short history, dating essentially from the postwar years (Whitehand 1987). Furthermore, outside central Europe, it became the mainstream of geography for long periods, especially in the United States (Whitehand 1987).

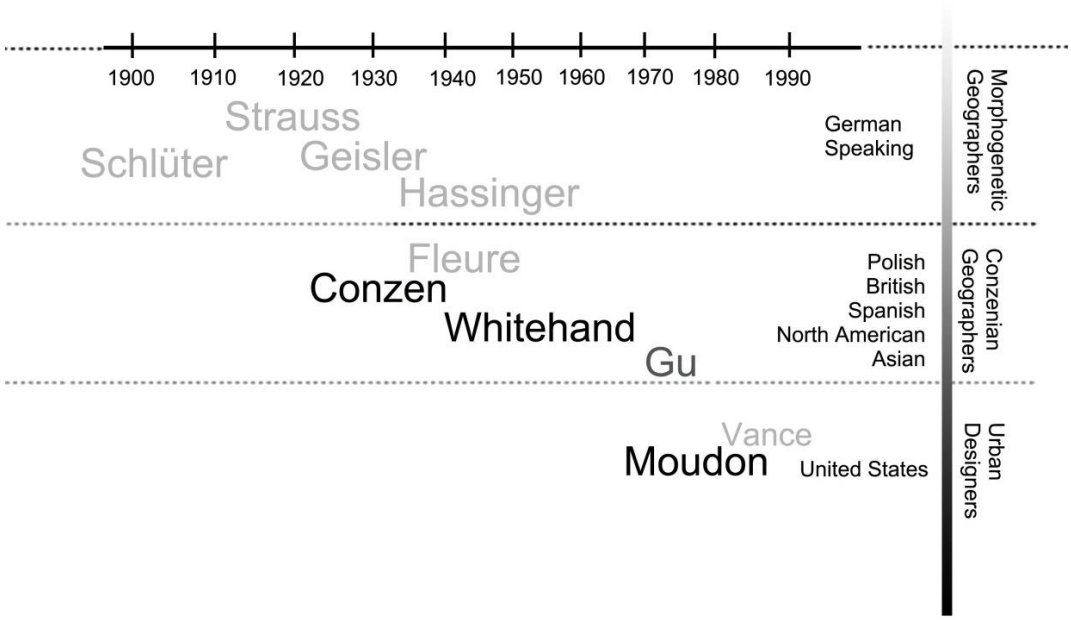


Figure 2.1 Issues and Perspectives (Whitehand 1987)

The morphology and evolution of cities have been extensively studied by geographers, economists, and social scientists for centuries (Whitehand and Gu 2007). Three classic theories of urban morphology were developed: the concentric zone theory, the sector theory, and the multiple nuclei theory (Moudon 1997).

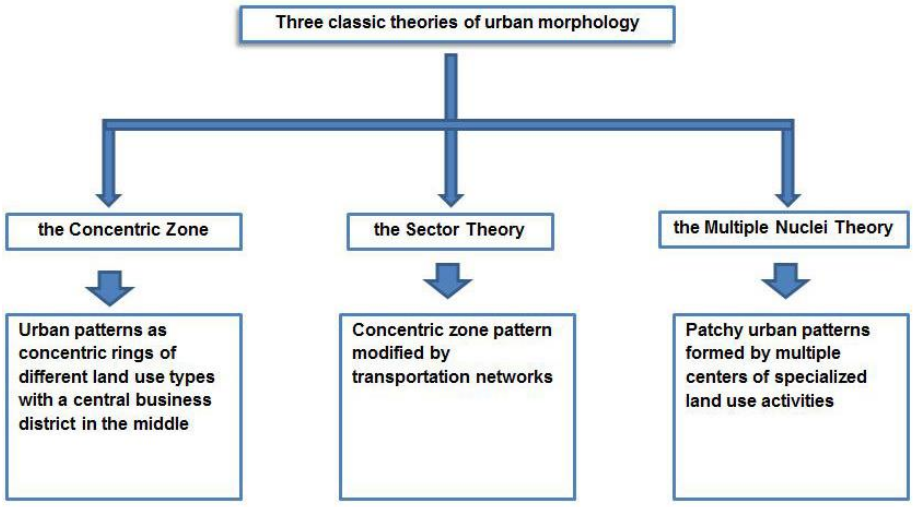


Figure 2.2 Three Classic Theories of Urban Morphology (Moudon 1997)

Since the 1960s, a variety of new theories and methods have been used for describing the form and formation of urban systems (Conzen 1981). In contrast with the three classic theories of urban morphology discussed above, new approaches such as the "Conzenian," named after its principal proponent, geographer Conzen M. R. G, is well applied for management of urban landscape (Whitehand and Gu 2007).

2.3.1 Conzenian

Conzen was not only interested in the layout of the towns and cities but he also contributed significantly to the separation of urban landscape into portions (Whitehand 2010). Conzen proposed three distinct and integrated urban forms; the town plan, or ground plan, which included streets, plots, sites, and block plans; the building fabric; and the land and building utilization (Conzen 1981). Another Swedish geographer, Torsten Hägerstrand, like Conzen, recognized the need to integrate the various components for study and analysis (Conzen 1981). He identified a major problem: "...science and technology are not concerned with how the various phenomena on the Earth's surface connect with one another to create the environments in which people live: the emphasis is on specialization rather than integration" (Whitehand and Gu 2010 p.6949).

The thoughts of the Conzenian approach have their advantages in analyzing the relationship between the elements and their adjacent environment (Whitehand 2010). Conzen contributed to "develop the relationship to the plot, which constituted a very detailed, micro-scale framework" (Whitehand 2001).

When trying to integrate the results of the individual portions, Conzen identified two specifically important elements. The first was the "historicity of urban landscape" (Whitehand and Gu 2010 p.6951), which means the "historical expressiveness" (Whitehand and Gu 2010 p.6951). The development of a city is a schematic, chronological process. Thus it is important to be aware of the "uncovering of historical and geographical order" (Whitehand and Gu 2010

p.6951), which contribute to the intellectual activity of regionalization. Another significant element is “morphogenetic priority” (Whitehand and Gu 2010 p.6951). This refers to those persistent or lifespan elements that comprise each complex form (Whitehand and Gu 2007). These elements include the old street grids, land, and building utilization (Whitehand and Gu 2007). These elements are reluctant to change through a long period of time and keep a static state to some degree (Whitehand and Gu 2007).

2.3.2 Burgage Cycle

Conzen provided many contributions to the concepts of urban development. One of these important ideas was the “burgage cycle” the strip plot held by an enfranchised member of a medieval borough (Whitehand and Gu 2010 p.6948). The cycle combined the progressive filling-in of buildings and clearing of buildings which showed a period of “urban fallow” (Whitehand and Gu 2010 p.6948).

In addition, the burgage cycle used dimensions to pursue the analysis of reconstructing the historic plot boundary. The analysis was used to detect regularities, the intentions of the previous planners, and to infer the original plot widths and changes.

2.3.3 Fringe Belts

A fringe belt includes open space, often vegetated, such as parks, playgrounds, and public facilities (Whitehand and Gu 2011). Varying in shape and size, the concept of the fringe belt itself differs from culture to culture (Whitehand and Gu 2011). However, it has “developed almost entirely in Western or strongly Western-influenced parts of the world” (Whitehand and Gu 2011 p.47).

The fringe-belt concept was first recommended in Berlin in 1936. “Fringe belts were shown to have a number of physical attributes, including vegetated areas, buildings, and a sparse road network with a low incidence of radial roads” (Whitehand 2001 p.36). A fringe belt was the result of a combination of these and other influences (Whitehand 2001).

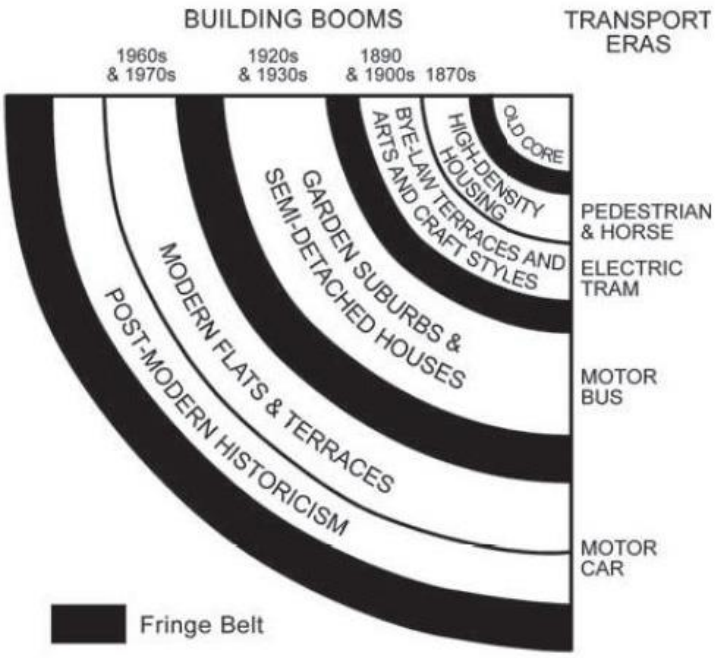


Figure 2.3 An Innovation/Building Cycle Model (Whitehand 1984 p.12)

Fringe belts are important for understanding urban morphology and urban planning. To fully comprehend their significance, it is important to refer to relationships, including “building cycles, land values, and the adoption of innovations” (Whitehand and Gu 2007 p.4). By studying the process of city planning, the relationship and the changes among the basic characters in the surrounding environments are more obvious and understandable. Some examples are the density and patterns of circulation, unique land uses, building coverage, and the sizes and shapes of plots (Whitehand and Gu 2011).

Urbanization has profoundly transformed natural landscapes throughout the world, which has inevitably resulted in various effects on the structure, function, and dynamics of ecological systems on a wide range of scales (Whitehand and Gu 2011). For example, land transformations associated with urban expansion can significantly affect biodiversity, energy flows, biogeochemical cycles, and climatic conditions from local to regional scales (Whitehand 2010). Therefore with accelerating urbanization throughout the world, it is becoming

increasingly important for large-scale ecological research and applications to consider these dramatic land transformations and their ecological consequences (Whitehand 2010).

No matter how cities are formed, their spatial structure affects physical, ecological, and socioeconomic processes within their boundaries and beyond (Whitehand 2010). A major goal of this thesis is going to be to understand the relationship between the spatial structure of urbanization and developments of open space.

2.3.4 New Challenge

With the changes in urban form, the elements of the fabric have changed (Friedberg 2004). Streets have been transformed into transportation infrastructure, notably motorways and highways (Friedberg 2004). In the case of constructed space, blocks have been transformed into linear or point-block buildings and traditional public buildings have been transformed into facilities (Friedberg 2004). In the case of open space, gardens and parks have been transformed into lawns and playing fields; open squares have been transformed into elevated walkways, podiums, malls, and sometimes, parking or other facilities (Friedberg 2004).

The identification of these new urban elements and typological transformations must be refined and developed: the principal aim of morphological analysis of the new fabric should be the understanding of changes that have led to its creation (Whitehand 2010). The problem, therefore, in considering urban morphology, is to analyze the contemporary urban fabric, to understand its distinctive components and specific processes of formation; to study its syntax, but in a critical way. Based on the demands of today and our knowledge of the general rules of the formation of the urban fabric, the aim should be to determine some criteria of quality for the creation of a new urban fabric.

Cities around the world are growing at an accelerated pace. They moved quickly from manufacturing to informational economies and from informational to cultural economies (Agnew and Mecer 1984). “Culture is now seen as the magic substitute for all the lost factories and warehouses and as a device that is going to create a new urban image” (Hall 2000 p.640).

2.3.5 Plan Analysis

In Conzen's research, he mentioned "an evolutionary method of plan analysis" (Conzen 1981 p.25). Based on the original plan, changes were made to preserve the traditional features as a basis for future development (Conzen 1981). Thus it is important to follow these changes throughout the century to understand their impact on the present patterns.

In the analysis, Conzen compared historical maps (see figure 2.4) in 1723, 1746, 1770, 1830, 1859, 1890, and 1940 of Newcastle, England. By comparing these historical maps, Conzen tested three distinct changes in the plan (Conzen 1981 p.28):

- *additions to the circulation system*
- *areas showing burgages and representing through consistency the holdings of the enfranchised members of a medieval borough*
- *the ancient town fringe along the town wall*

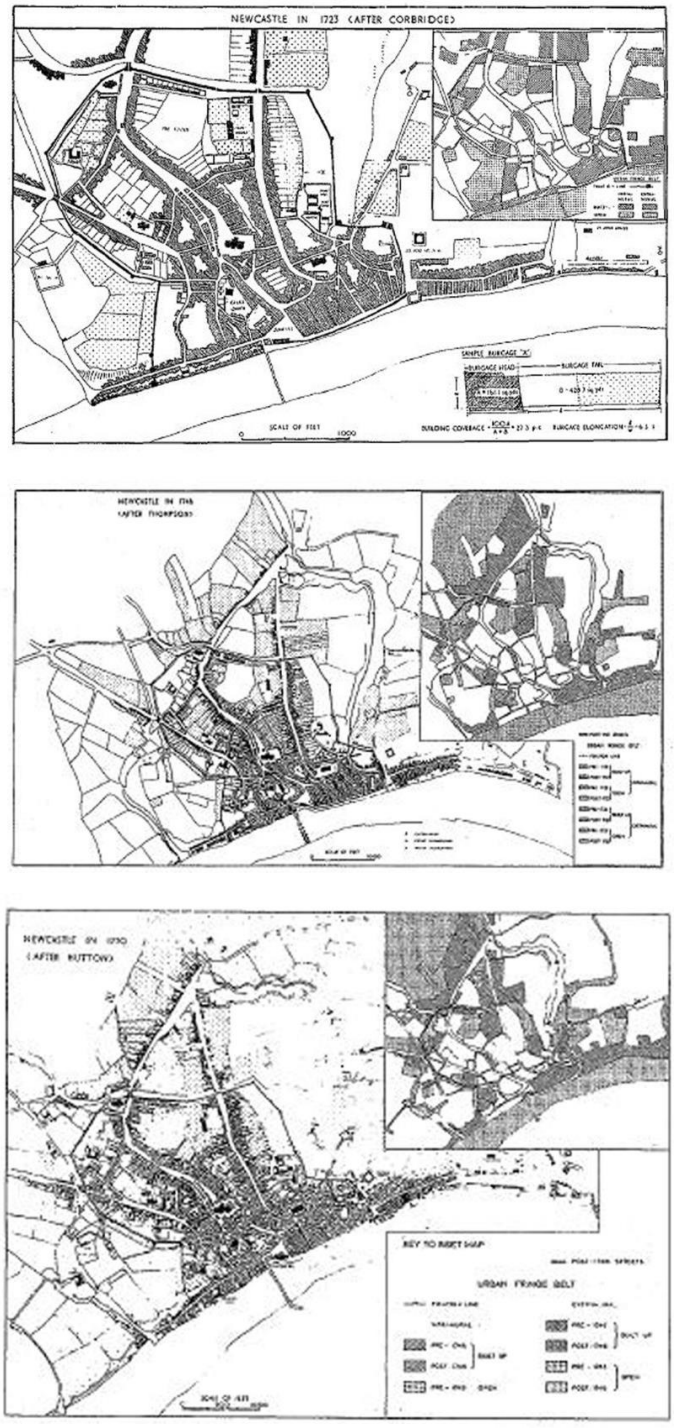


Figure 2.4 Maps of Newcastle in 1723, 1746, 1770 (Conzen 1981)

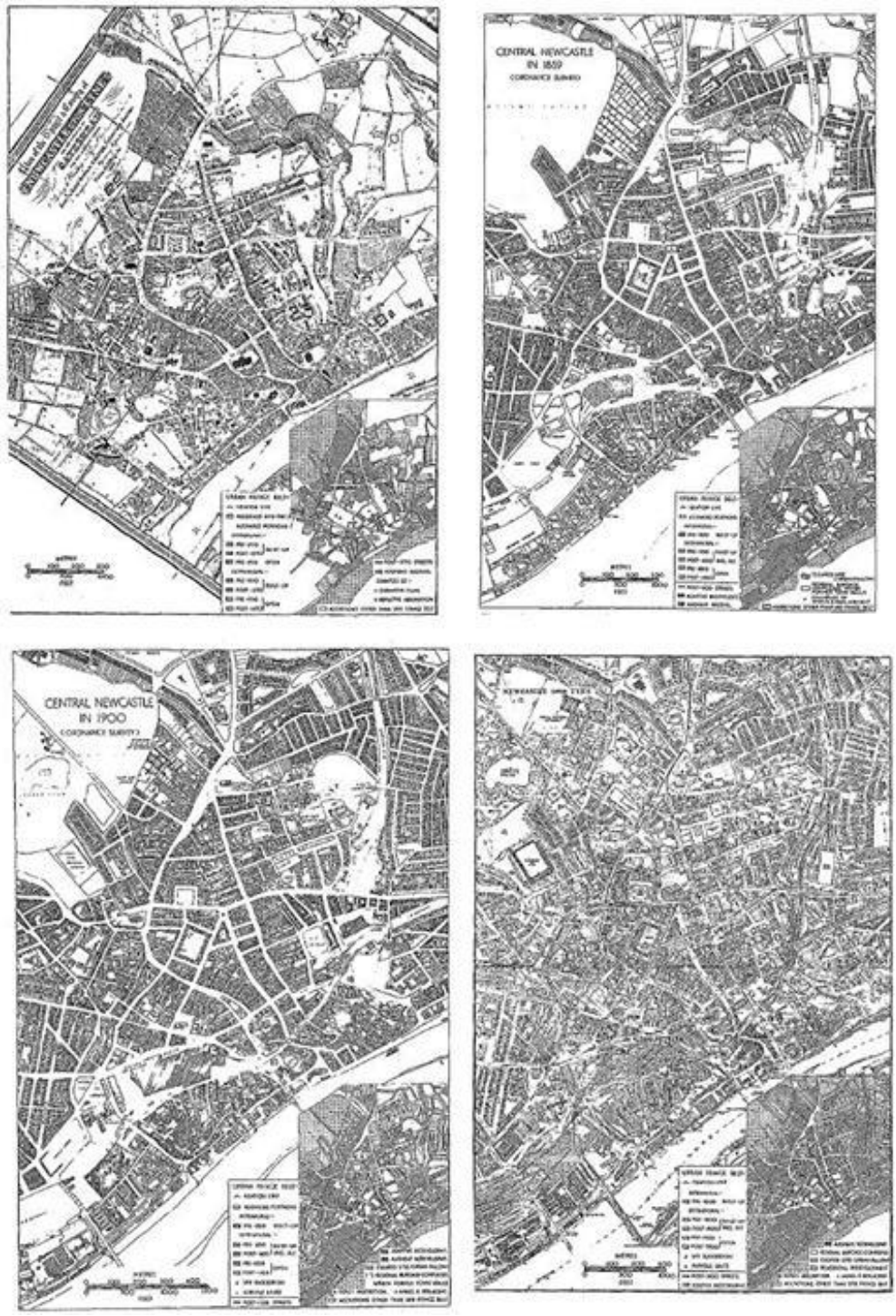


Figure 2.5 Maps of Newcastle in the 1830, 1859, 1890, 1940 (Conzen 1981)

2.4 The City Growth of Fort Worth

Beginning in 1867, the Chisholm Trail drove cattle from Texas to Kansas and was followed by the arrival of the railway in 1876. Both stimulated the early growth of Fort Worth. During this period, parks were used as anchors at the ends of transit lines to insure ridership of the transit system (City of Fort Worth Planning and Development Department 2004).

Based on the original plan by Kessler (1909), which lasted for almost one hundred years, changes have been made to preserve the traditional features (Kessler 1909). It is important to acknowledge these changes through the century as they have occurred over time in order to understand their impact on the present plans.

2.4.1 Metropolitan History Begins With Geography

Generally, the Dallas/Fort Worth metroplex is shaped by man-made lakes cut by streams, creeks, and rivers surrounded by forest land (Fort Worth National bank 1965). Many areas of Denton, Johnson, Parker, Tarrant, and Wise counties are located in the Fort Worth Prairie region of North Texas, which has less fertile and rockier soil than the Texas Black land Prairie (Swadek and Burgess 2012).

2.4.2 Beginning of the Parks System in Fort Worth

Kessler's original park Plan for the city of Fort Worth served as the basis for the implementation of major park facilities that became the heart of the development of the parks system (City of Fort Worth Planning and Development Department 2004). Even today, Kessler's plan can be traced and is still treated as a discipline for future urban planning.

His plan was influenced by the natural environment around the city and working with the natural watershed and the city's rivers. The plan was also used to connect the residential areas with the business districts within this system (City of Fort Worth Planning and Development Department 2004). In 1930, "A Comprehensive Parks System for Fort Worth, Texas" was conducted by Hare and Hare, and was accepted by the City Council. In the 20th century, Fort Worth emerged as a rich and unique landscape development.

2.4.3 Open Space System in Fort Worth

Significant development years of Fort Worth's parks plans include (City of Fort Worth Planning and Development Department p.2 2004):

- 1909, first park master plan by George Kessler
- 1930, successive park master plan by Hare and Hare
- 1957, successive park master plan by Hare and Hare
- 1992, a strategic plan to guide the management of department resources based on the previous plans (internal)
- 1998, adopted by the City Council of the 1998 park, recreation, and open space master plan (internal)
- 2004, endorsed by the city plan commission of the new park, recreation, and open space master plan (internal)

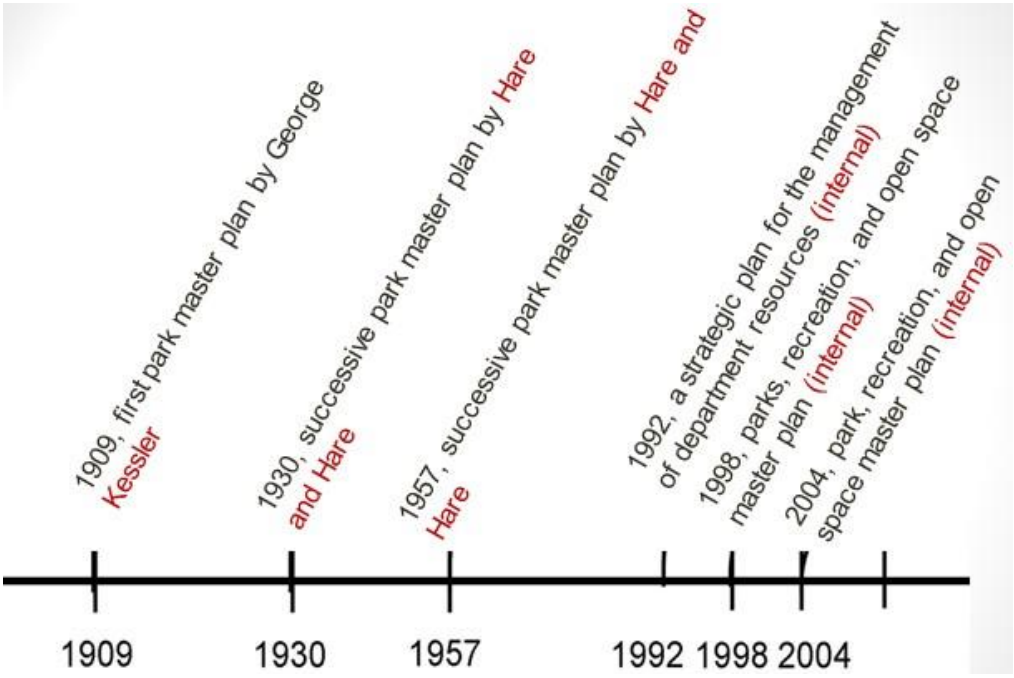
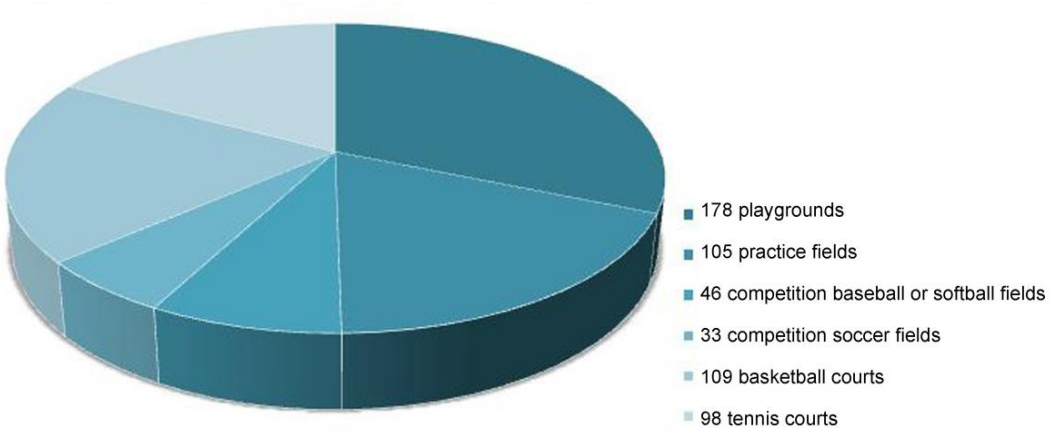


Figure 2.6 Significant Years of Park Plans (Parks and Community Services Department 2012)

Fort Worth has 260 parks with 11,648 acres of parkland, which makes up 5.3% of the total land within the city limits (City of Fort Worth 2012). These include 178 playgrounds, 105 practice fields, 46 competition baseball or softball fields, 33 competition soccer fields, 109 basketball courts, 98 tennis courts, seven pools, five golf courses, about 70 miles of trails and 111 picnic shelters (City of Fort Worth 2012). Over the years, Fort Worth has been recognized for its efforts of earning the State Gold Medal in 1992, 1994, 2001, and 2005 for having the best managed large park system in the state as well as earning the National Gold Medal in 1996 for having the best managed large park system in the United States (City of Fort Worth 2012).

Table 2.1 Fort Worth Park Category (City of Fort Worth 2012)



2.5 Summary

This chapter discussesed the concept of the urban morphology and the current research achievements based on the "Conzenian" theory. A significant point of Conzen's theory is to conserve and manage the historical characteristics of the city. The methodology used to analyze the evolution of the parks system according to urban morphology is going to be discussed in the following chapter. Understanding the significance of the relationship between the parks system and urban forms of Fort Worth helps planners and designers to "read" the city better. It also illustrates the challenges faced in future planning.

CHAPTER 3

RESEARCH METHODS

3.1 Introduction

This chapter explains the methods used in this research. Qualitative research methods were used for this study because the research questions require information about how people think and act (Taylor and Bogdan 1985). GIS tools were adopted in this research to collect the information and to answer the research questions. GIS data provided precise and solid evidence in analyzing the development of the city's pattern. Interviews were used to collect various perceptions of the parks system and its relationship with the city's form. The selected respondents were from the city of Fort Worth's Planning and Development Department, Park and Community Services Department, or from individual designers and planners in landscape architecture firms who provide planning and design for the city. In addition, interviews significantly contributed to a further understanding of the history and culture of Fort Worth. Respondents' opinions and understandings were compared with findings from the plan analysis.

3.2 Research Design

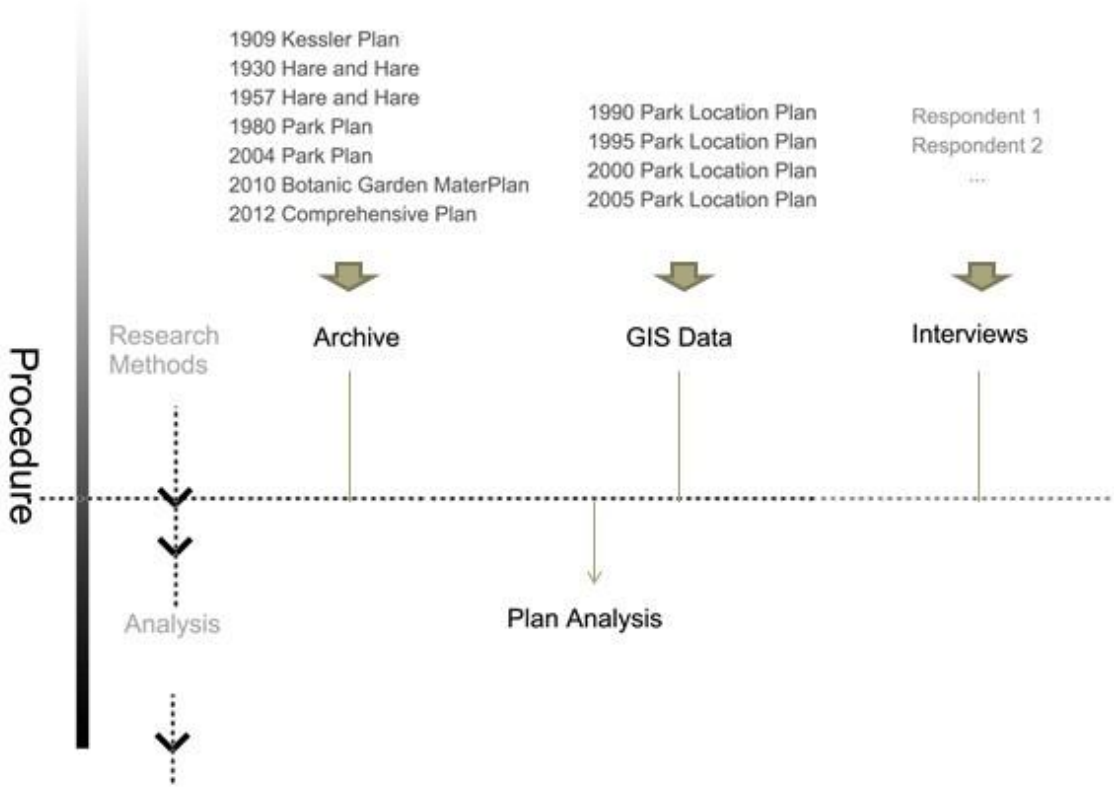


Figure 3.1 Research Procedure

The site used in this study was Fort Worth. The unit of analysis was open space. Data collection was involved in these three ways: secondary data (including GIS data), archive, and interviews.

3.2.1 Geographic Approach

Maps created by the GIS program are presented to show the relationship between the parks and city patterns of Fort Worth. The GIS data of Fort Worth are based on the North Central Texas Council of Governments (NCTCOG) land use data set. The GIS Data are only available after 1990, thus before 1990, the plan analysis is depended on the historic maps and documents. GIS technology involves a series of data collection, such as location, zoning,

buildings, transportation, vegetation, streets, and so on, which is going to help to understand the individual urban fabric in the study.

Land use information provides the basic description of activities within Fort Worth. Land use data, besides GIS data, are acquired through several other sources such as field surveys. Major land use categories include:

- Parks and recreation
- Water
- Vegetation
- Transportation, communication, and utilities
- Cultural and entertainment
- Vacant land

The city transportation works as a connection to link the city together. Roads, streets, and highways bring people to their destinations. This linkage also helps to connect and provides for the development of other activities.

3.2.2 Plan Analysis

In Conzen's research, he mentioned an evolutionary method of town plan analysis (Conzen 1981). He suggested, "recurrent phenomena in the old-established towns, appear to be of general significance and await the test of wider application" (Conzen 1981 p.25).

In this thesis, the town plan analysis is used to examine the case of Fort Worth, specifically using the parks system as an element to study the urban morphology. Conzen also mentions three distinct and integral elements in the plan analysis: "the streets and their street system, the plots and their plot patterns, and the building arrangement within these patterns" (Conzen 1981 p.25).

When applying the method for this research in Fort Worth, specific elements have been taken into consideration. As demonstrated previously, parks play a very important role in forming Fort Worth's character. The first park plan is developed for this city over a century ago,

however, the city is still influenced by some ideas of the plan. Thus, a thorough study of Kessler 1909 park plan is significant.

3.2.3 Interviews

Most of the hard copies of the historic parks plans have existed for a long time. Due to limited preservation technology, some of the written documents are incomplete or hard to read. In order to complete the analysis, interviews are conducted to get a better understanding about the thesis topic. Based on the assumption made by the plan analysis, the interviews also help to uncover these reasons and provide an overall view of the whole evolution of the parks system and the urban morphology as well as the relationship between them.

3.2.3.1 Selected Respondents

Because this research needs a better understanding about city planning, and urban morphology theory, one needs a solid knowledge of 1909 Kessler park plan and the evolution of Fort Worth parks. Based on this consideration, designers, planners and landscape architects from the Planning and Development Department, as well as the Parks and Community Services Department of Fort Worth are the ideal interviewees. Also individuals that provide planning or design for the city and who get involved in the relative research for city are also selected as interviewees. These interviewees have either worked or lived in Fort Worth for a long time. They vary from different experience and academic backgrounds, thus their opinions represent more common and significant ideas.

Respondents are selected based on recommendation from the thesis committee, the Planning and Development Department, and the Parks and Community Services Department. Eight respondents are selected. Six of them are from the professions of landscape architecture, planning and architecture. Two of them are local historian.

3.2.3.2 Interview Procedure

Figure 3.2 Interview Procedure

Interviewees are asked a series of profile questions including respondent's name, professional background, and years of involvement in the projects. The responses are used to provide a better understanding of their experience and familiarity with the projects. After collecting the data and analyzing the interviews, results are compared with the previous analysis to better understand the evolution of the parks system. The interviews are audio recorded. After the interviews a digital file is going to be transcribed.

3.2.3.3 Interview Questions

1. How do open space plans affect the city's land uses?
2. How do open space plans affect the city's shapes or form?
3. Conversely, how does land use planning affect open space?
4. When did the change happen? (if a respondent indicates a change)
5. Does the 1909 Kessler plan still influence Fort Worth?
6. What comes to mind when you see these images of Fort Worth's shapes or form?

3.3 Limitation

The first criticism of qualitative research is human error and bias. This thesis concentrates on the relationship between urban morphology and the parks system which requires a deeper knowledge about the combination of land use, planning, open space, and

historical background. Most of the interviewees understand the complicated mix, but some show very little concern about the relationship between each of the elements. This should be taken into consideration in the evaluation of the results and implications in the following two chapters.

The second limitation is the accuracy of the secondary data such as the old master plans. As mentioned previously, most of these historical maps have been preserved for a long time. Due to damage or other factors, they may not provide enough, or even correct information, to analyze. In order to limit the disadvantages, the field survey searches for other solid documented evidence and interviews from the experts are taken into consideration.

CHAPTER 4

ANALYSIS AND FINDINGS

4.1 Introduction

This chapter contains data analysis and key findings. The data is analyzed in three main sections:

- Plan analysis from old maps and historic documents
- GIS data analysis
- Interviews

Section 4.2 presents the development of the urban morphology in Fort Worth since the 20th century. Section 4.3 discusses the park plan analysis based on the historic documents. Section 4.4 focuses on the analysis from the interviews. Key points from these findings are highlighted in section 4.5.

4.2 Development of Urban Morphology in Fort Worth

The city of Fort Worth began as a military fort. Growth of the city was based on the geography, the cattle trail, and the railway. Although Vance states, “Morphology can be immortal, though it often is not” (Vance 1990), based on the available data, the way in which the urban morphology developed in Fort Worth can still be read. In this section, a series of images showing the shape of Fort Worth as it has grown since the 1900s are going to be presented to give a brief explanation of Fort Worth’s morphology in the 20th century.

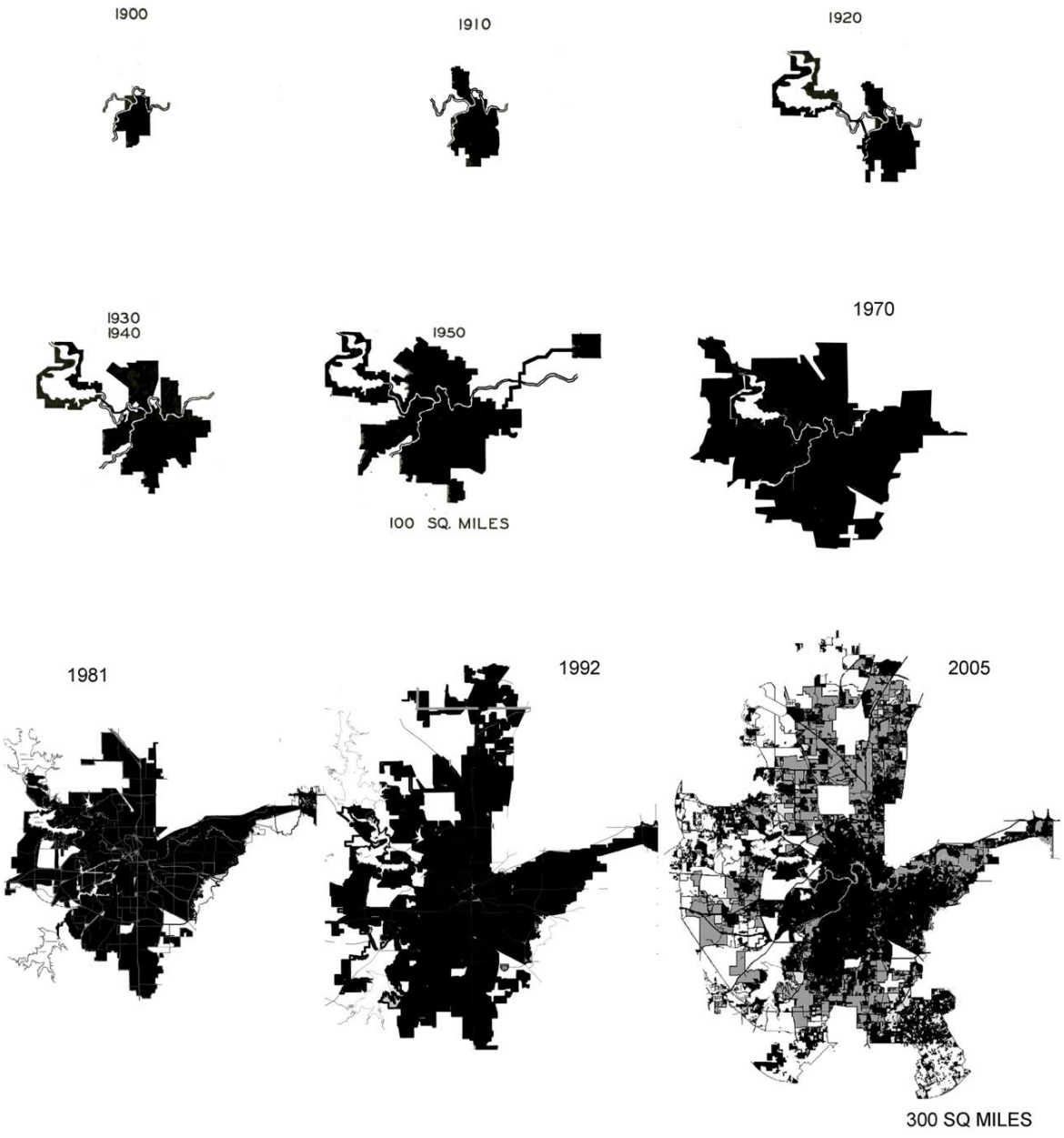


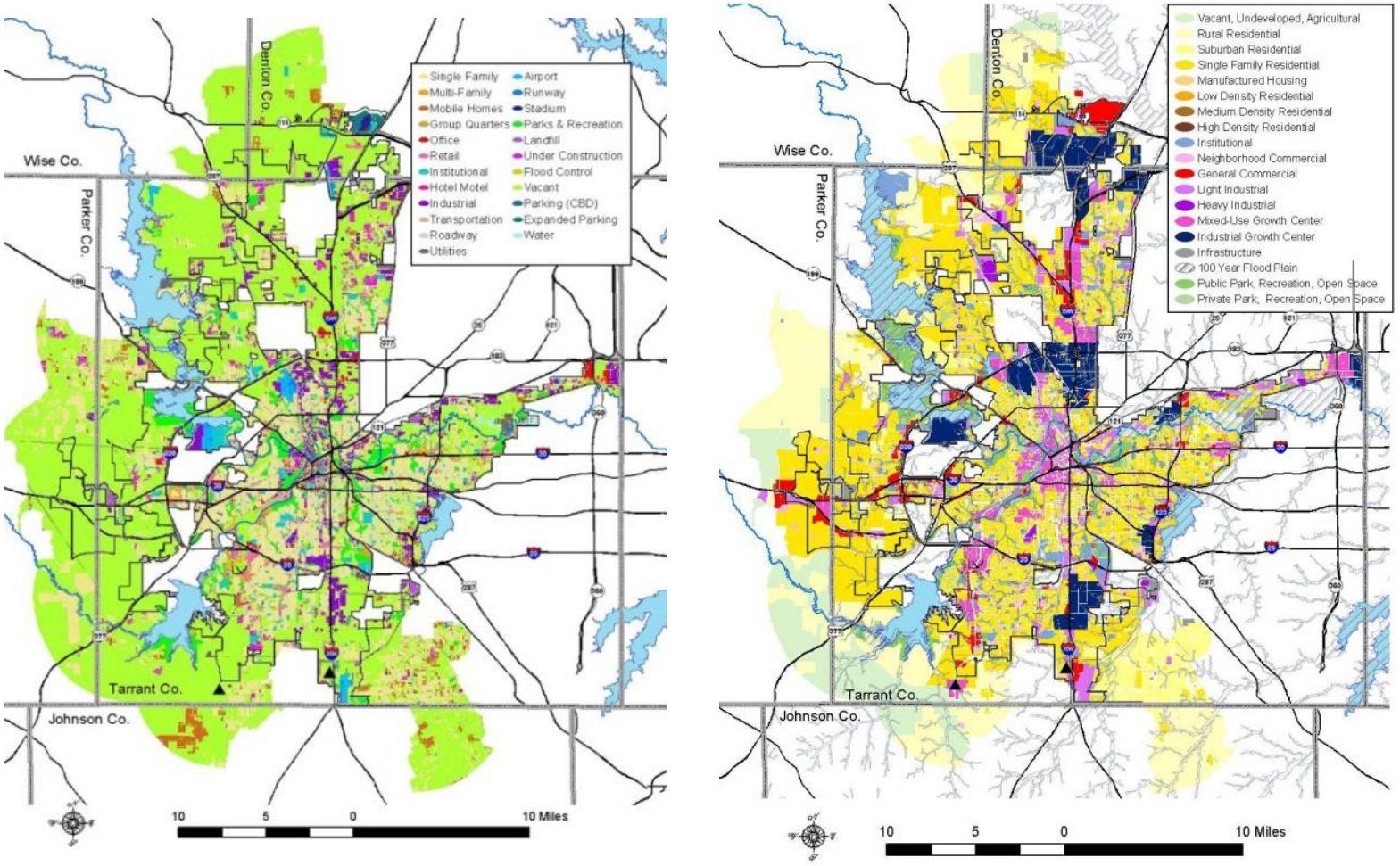
Figure 4.1 Growth of Fort Worth (City of Fort Worth 2013)

From the figures above it can be concluded that:

- Later in the 1920s, growth to the west, north, and east was shaped by other creeks and streams including the Clear Fork channel of the river.
- Between approximately 1900 and 1950, the city's land values increased 300% (Hare and Hare 1957).
- Between the 1930s and the 1980s, the city expanded in four directions but primarily to the west and southwest.
- After the 1980s, the main growth areas of the city were to the north and south.

Figure 4.2 Bird's Eye View of Downtown 1950s (RLK 2003)

From the 2005 Land Use Map shown below, most of the suburban area and its extra-territorial jurisdiction (ETJ) are currently undeveloped, and covered with vegetation. Conversely, the plan in the 2025 Land Use Map was to develop most of the ETJ with residential and mixed-use space. This future proposal provides additional evidence that Fort Worth is going to be developed outward at a dramatic speed in the immediate future.



(a) (b)

Figure 4.3 (a) 2005 Land Use Map (b) 2025 Land Use Map (City of Fort Worth 2012)

4.3 Parks Plan Analysis

Parks play a significant role in the development of Fort Worth. To provide a better understanding of the relationship between parks and the urban morphology, Kessler's plan, written documents, historic photos, and the plan analysis through the past hundred years are going to be illustrated.

4.3.1 Kessler's Plan

In 1909, Kessler was invited to create the park plan for the city of Fort Worth. He said, "In the competition of cities for new and desirable population, no other element of advertisement is worth so much as an attractive park system, making a pleasant city in which to live comfortably" (Kessler 1909 p.2).

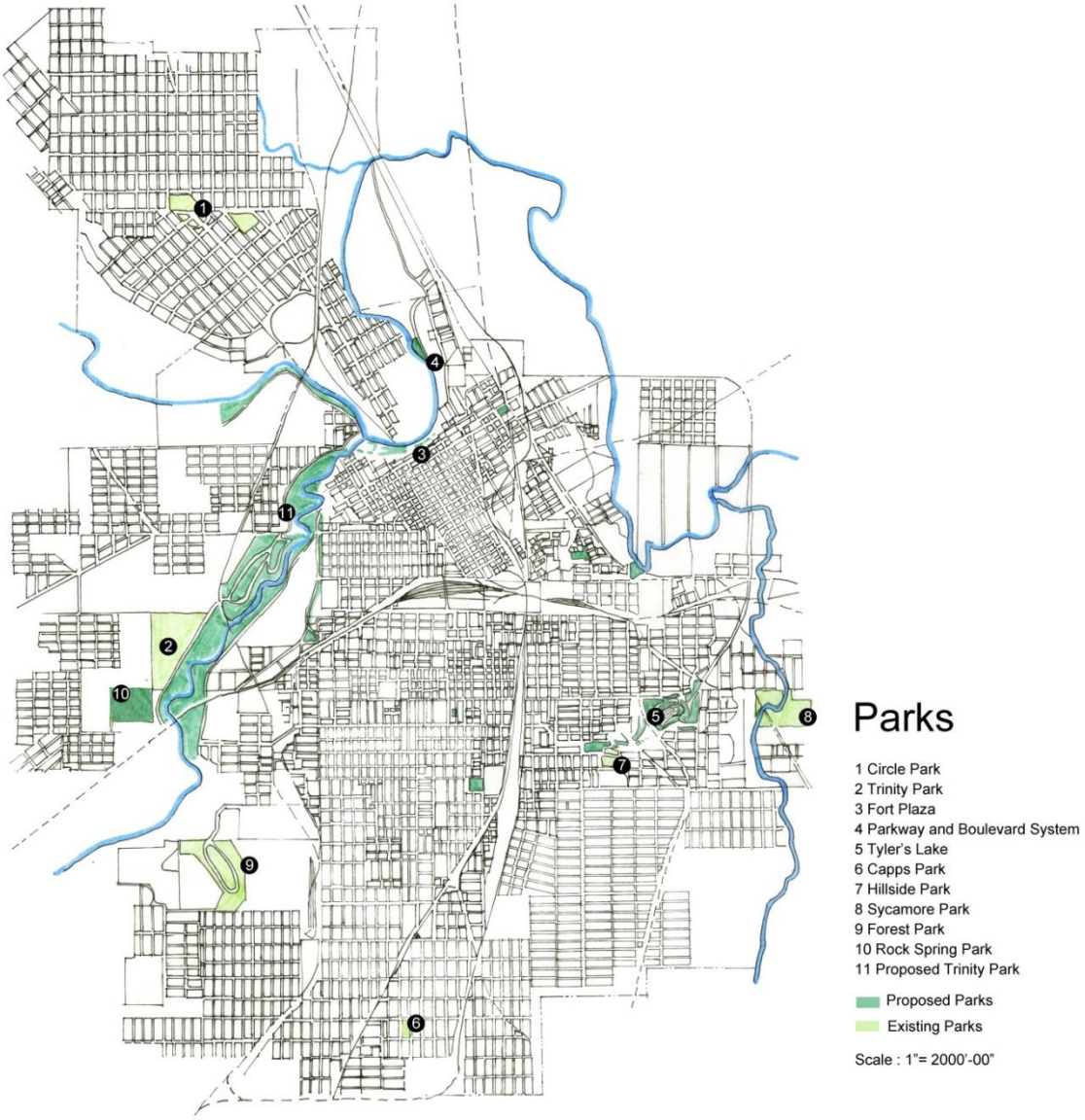
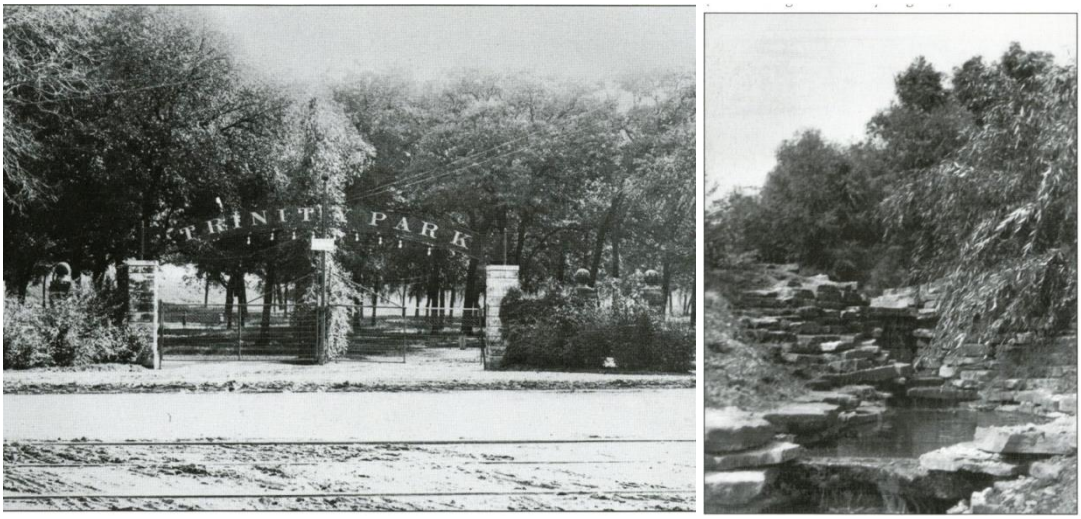


Figure 4.4 1909 Kessler Park Plan (Kessler 1909)

List of Kessler's important suggestions:

- Trinity River Project
- Rock Springs Park in 1912 (Botanic Garden)
- Glenwood Park, located in east Fort Worth, planned as an athletic field with a variety of recreational amenities
- Boulevard and parkway system along the downtown area



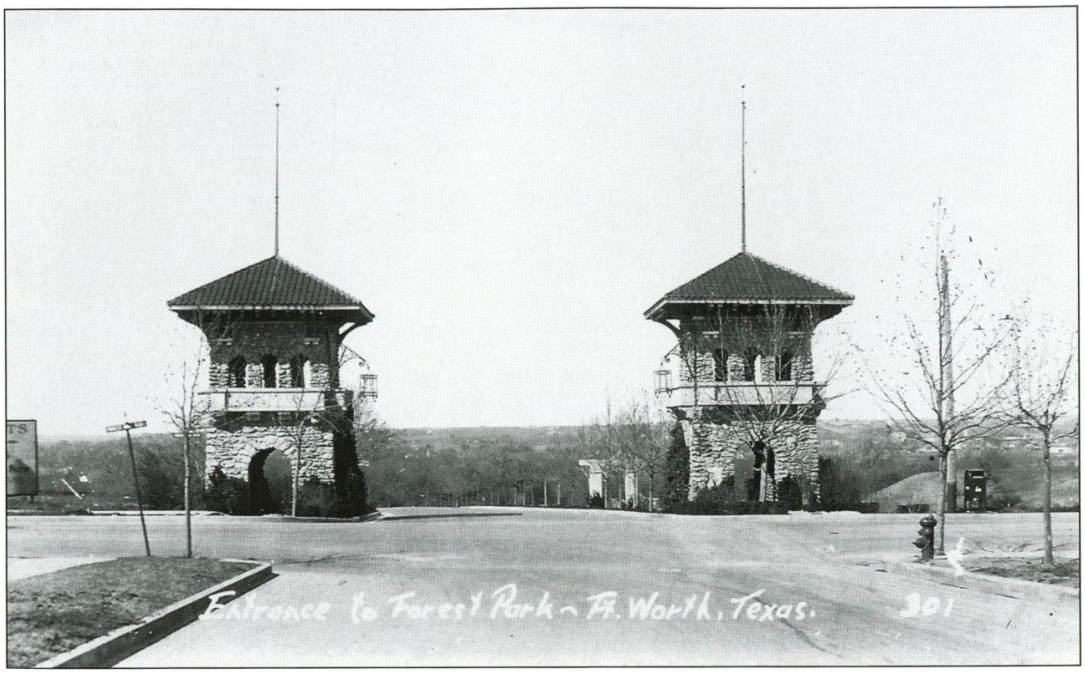
(a) (b)

Figure 4.5 (a) Trinity River (Kline 2010) (b) Rock Spring Park (Kline 2010)

Rock Spring Park was also acquired based on the suggestion of Kessler for its “forest-like qualities and the natural springs for which it was named” (Kline 2010 p.38). The parks had experienced increased construction and development during the later years.

Now, Rock Spring Park has become the Fort Worth Botanic Garden, which is listed on the National Register of Historic Places (National Register Listings 2012). It has reached about 110-acres and is “located to the immediate east along with the Trinity River Green belt” (Fort Worth Botanic Garden Master Plan 2010).

(a)



(b)

Figure 4.6 (a) Forest Park (b) Entrance of the Park (Kline 2010)

Forest Park is famous for its “rolling terrain and native trees offset by large open areas,” which represented the natural scenery of Fort Worth (Kline 2010 p.18). The park was also acquired based on suggestions from Kessler.

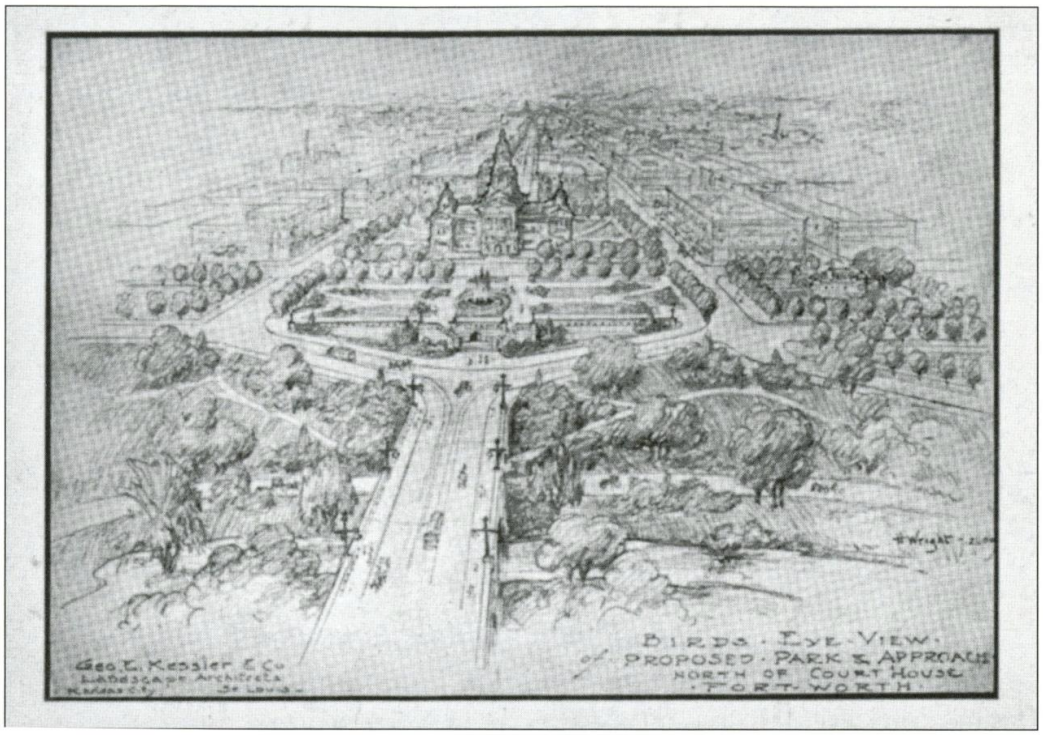


Figure 4.7 Historic Postcard (Kline 2010)

This image above (see figure 4.7) above shows another park for the Tarrant County Courthouse that Kessler suggested, but unfortunately, this idea was not accepted. Later parks, such as Paddock and Heritage Park along the bluff, provide a more appropriate setting for the grand building now (Kline 2010).

It is said that Trinity Park, Forest Park, and the Botanic Garden have become the most fully developed major parks in Fort Worth (Kline 2010). Most of them command the natural scenery that represents Fort Worth. From the study of Kessler's plan, three main ideas can be seen:

- Most of the construction was on the flood plain which follows rivers and streams
- Parks system links the city together
- Consideration for future development for parks and open space

4.3.2 1930 Park Plan

It was well-recognized that the 1930 park plan was a successor of Kessler's plan. It was based on Kessler's idea of "linking parks with scenic drives and greenways along the rivers" (Kline 2010 p.44). "Through the 1920s and 1930s, city officials were still advocating for the creation of a park-like setting on the bluff above the Trinity River. Hare and Hare's plan from 1930 shared similarities with Kessler's plan from 1909" (Kline 2010 p.47). Thus analyzing the 1930 Hare and Hare plan also helped to understand the main ideas of Kessler's plan.

The principle of the 1930s plan was to follow what Kessler had done to build parks according to their own geographic elements. Most of the parks were developed along the stream and creek lines. Hare and Hare's plan created a green belt to connect the city's neighborhood and open spaces.

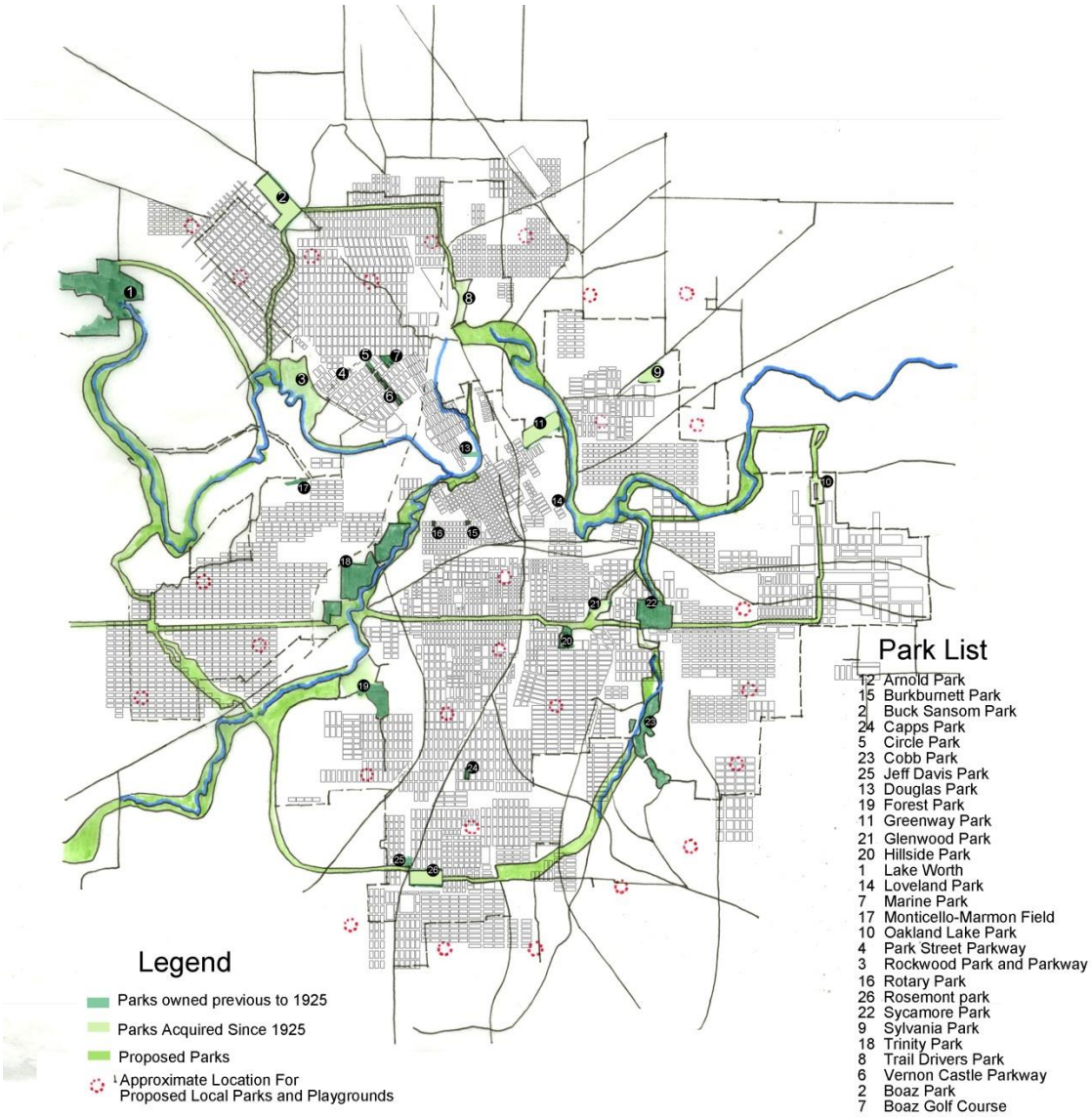


Figure 4.8 1930 Hare and Hare Park Plan (Hare and Hare 1930)

When comparing the two plan's green shape, it is clear that most of Kessler's suggestions are accepted, and the idea to link the green space together is also shown in the 1930 plan. The trend in the parks plan of creating connections through the city projected the way the city looks today.

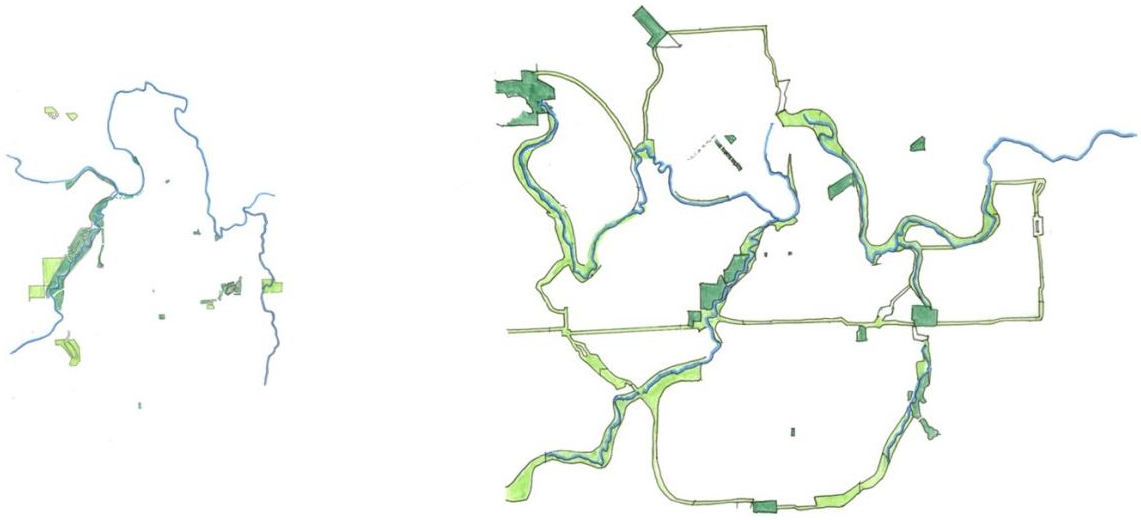


Figure 4.9 Green Areas of Kessler and Hare and Hare Plans (Kessler 1909, Hare and Hare 1930)

4.3.3 Kessler's influence

- Most of Kessler's suggestions such as the Trinity River, Rock Spring, parkway, and boulevard system have been accepted
- The idea of linkage by green system still plays an important role in parks planning
- More community and neighborhood parks are addressed, which makes the green system more balanced with the population density

The linkage of parks, trails, neighborhoods, and communities to each other increases beneficial opportunities for both humans and wildlife. Trinity River Trails show the importance of connecting the adjacent neighborhood and parks, which represents Kessler's idea of green belt connectivity.

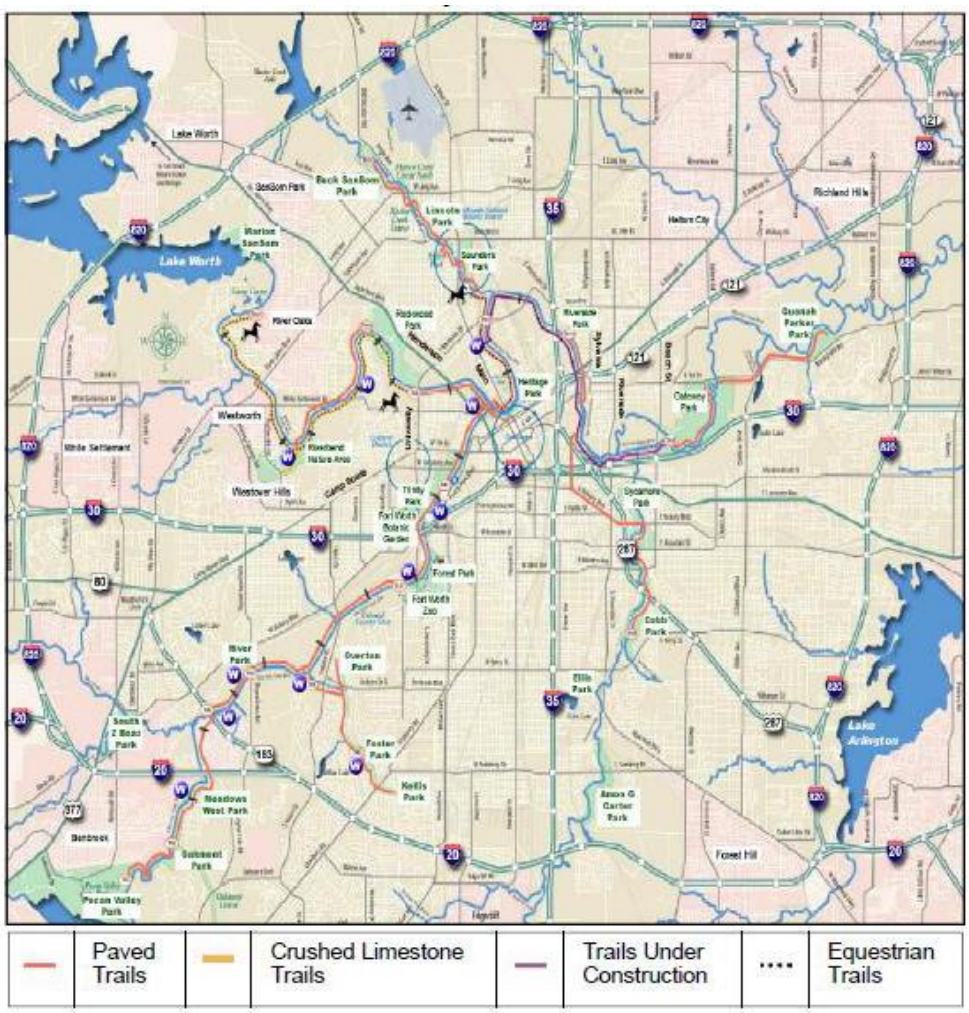


Figure 4.10 Trinity River Vision Master Plan (City of Fort Worth 2003)

The city also addresses the important detail of access to the linkage areas. For instance, the Botanic Garden provides easy access for citizens from all directions. Based on Kessler's plan, the Botanic Garden has been preserved as a beautiful open space even though improvements on the space have continued over the years. Travelling along University Drive is a "green escape" (Fort Worth Botanic Garden 2004).

The garden is going to benefit from future public transportation systems such as the proposed Montgomery Street entrance which is going to help to avoid congestion by vehicular

and parking issues (Fort Worth Botanic Garden 2004). It also contributes to the insightful decisions made by the planners.

Figure 4.11 Context Map (Fort Worth Botanic Garden Master Plan 2010)

4.3.4 Relationship between the Parks and Urban Morphology

In this section, the research identifies the relationship between urban morphology and the parks system by presenting the city's shape and the parks plan at different times. It also discusses the trends of how the city develops and the way in which the city responds to the parks plan.

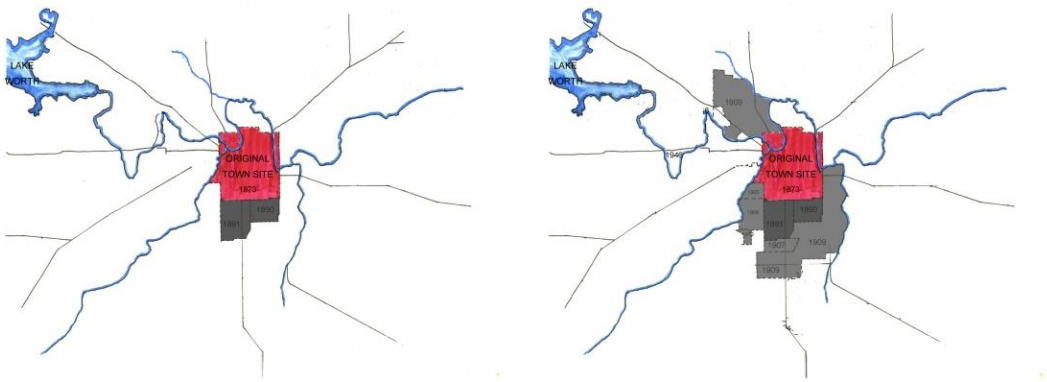


Figure 4.12 City Growth before 1910 (Sanborn 2013)

From the image above, it is obvious that before the 1900s, based on the town center, the city developed toward the south. Conversely, around 1910, the city expanded toward the north. Overall, the city developed in a south to north grid.

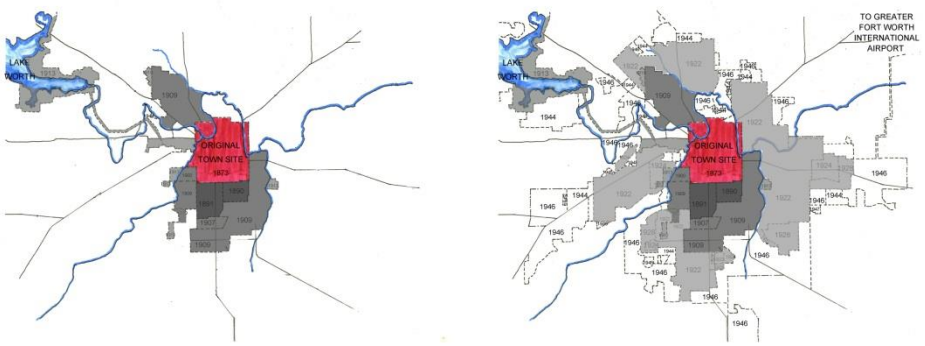


Figure 4.13 City Growth between 1911 and 1930 (Sanborn 2013)

After Kessler's plan, the city started to develop toward the west, making a connection with Lake Worth. Due to the Great Depression in the 1930s, growth slowed, but as growth resumed, the city stretched out in all directions.

It could be concluded that Kessler's suggestions for the Trinity River and Tyler's lake, as well as the linkage within the city, helped Fort Worth to expand in all direction rather than a linear development from south to north. Before the 1920s, from the original town site, the city had more development to the south while there was no development to the southwest. It was also obvious that the improvement of the Trinity River helped to emphasize the creek line. Thus, it stimulated the development of the southwest between the 1920s and the 1950s. Before the 1920s, the city developed from south to north with limited development in the west and east. This was due to the separation of natural features: such as the creeks and streams. But Kessler's plan developed the open space and made it possible for people to make connections.

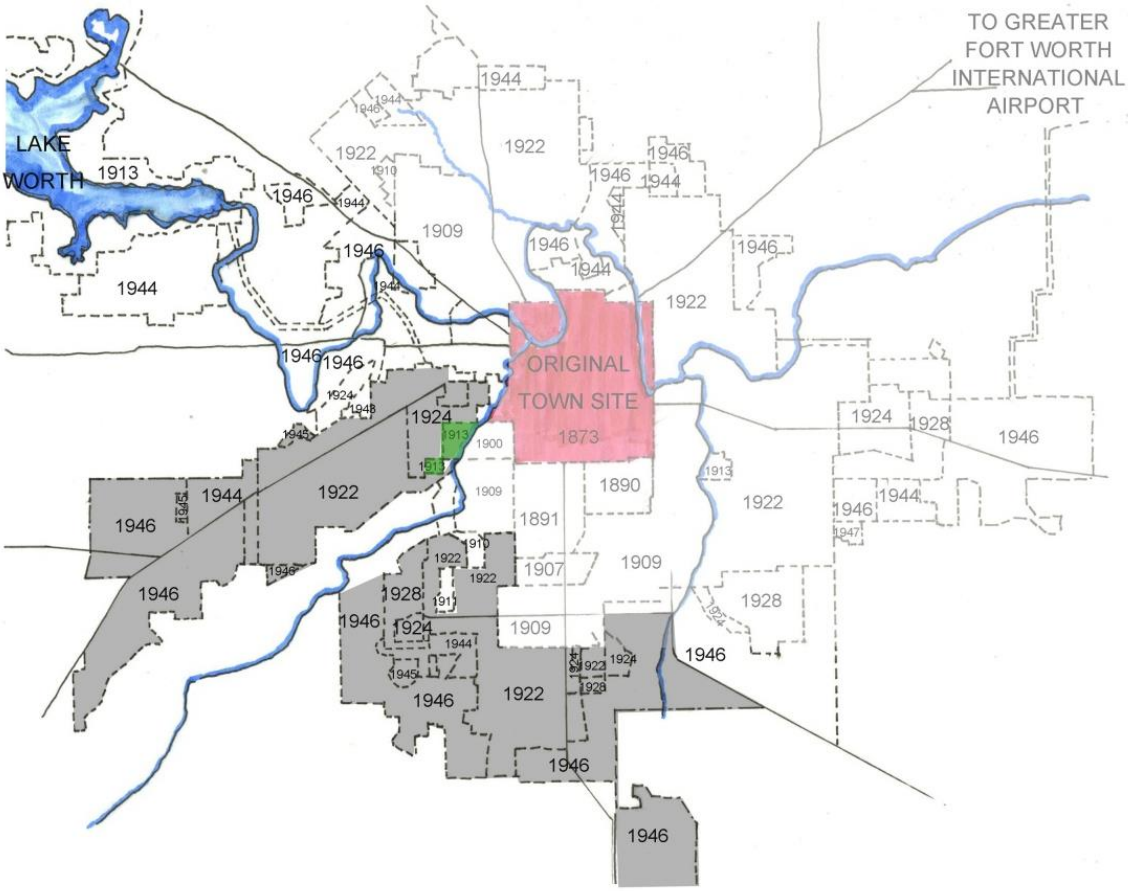


Figure 4.14 City Growth before the 1950s (Sanborn 2013)

After 1960, the city discontinued the contract with landscape consultants, Hare and Hare. The city decided to have its own department manage the parks system. Thus before 1960, the influence of Kessler's plan had much more influence, which supported the findings from the previous research.

The way the city performed on a newly development stage is going to be presented in this section. At this time, the city still enjoys dramatic growth not only in land but also in population. Based on the way the parks were developed, and the way the city was going to continue to develop the parks to provide a better environment to meet the increasing population became a big debate which continues today. As Kessler mentioned, the goal was to "build an attractive park system to make a pleasant city in which to live comfortably" (Kessler 1909).

It is concluded that the parks system is influenced by the urban morphology. Several reasons have led to limiting the influence of Kessler's plan. Primarily, the city developed at a dramatic speed. Compared with the1950s, the city areas grew three times larger. Kessler's plan was much more focused on the core area, and since the city grew beyond the natural separation, the influence of the urban morphology was more influential in shaping the parks.

The relationship between the parks and the city patterns changed. After the 1960s, the parks plan was more influenced by the city's shape and development. One example was the influence of freeways. National freeways provided easy access for citizens which contributed to the city in many ways. Freeways also had a significant effect on the open space. Building freeways required lands while open space were the most ideal places for such location. Most parks were public, which made it easy to negotiate compared with using other kinds of land. There was less construction in the open space, which made it ideal for development.

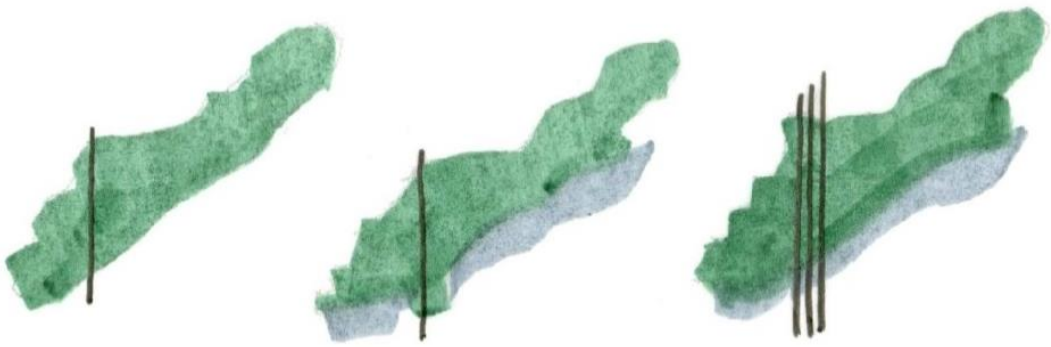


Figure 4.15 Influence of University Drive

The images above show the process of how the open space was eaten away by the freeway system. There were other construction projects, besides the freeway itself that contributed to the Botanic Garden (Fort Worth Botanic Garden Master Plan 2010):

- University Drive was widened through the Botanic Garden
- New ramps were built to improve traffic flow
- A channel to the river was built to receive surface runoff from University Drive

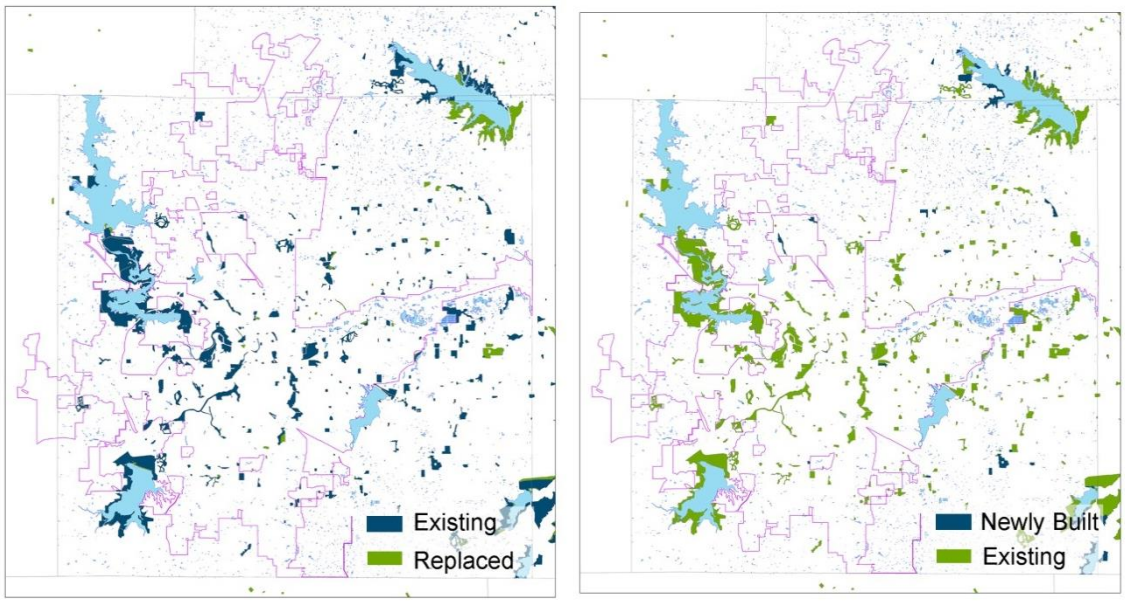
These projects took very little land, but when considering the city as a whole, the amount of land that was compromised by the freeway system was huge (Fort Worth Botanic Garden Master Plan 2010). Thus it definitely had an effect on the open space of Fort Worth, but in a negative way.

In the images (see Figure 4.16) that show changes in the green area from 1995 to 2005, notice that:

- Overall decrease in green space in the city
- Improvements to access of public parks, vehicular and pedestrian
- Improvements include connections to historic features in the city via public parks
- Improved associations with amenities along the park fringe including streams, creeks, and neighborhoods

Most of the parks that have been replaced are in northwest part of city while newly-built parks are on the south side. Compared with the urban patterns at this time, a development of the northwest part of city may lead to such results, because new construction is undertaking in that part, while the south part is much stable. This evidence shows that the parks system in Fort Worth was influenced by the city's development patterns.

In the analysis of the evolution of the parks system for Fort Worth, the three elements to be analyzed are: the city plan, the parks system, and the parks. According to the park plan from 1990 to 2005 (see Figure 4.16) which was created based on the GIS data from NCTCOG, three significant changes can be seen below. These three significant changes are going to be illustrated and fully explained in the following chapter from the Kessler 1909 plan to the 2013 parks plan, which is the latest version that is available.



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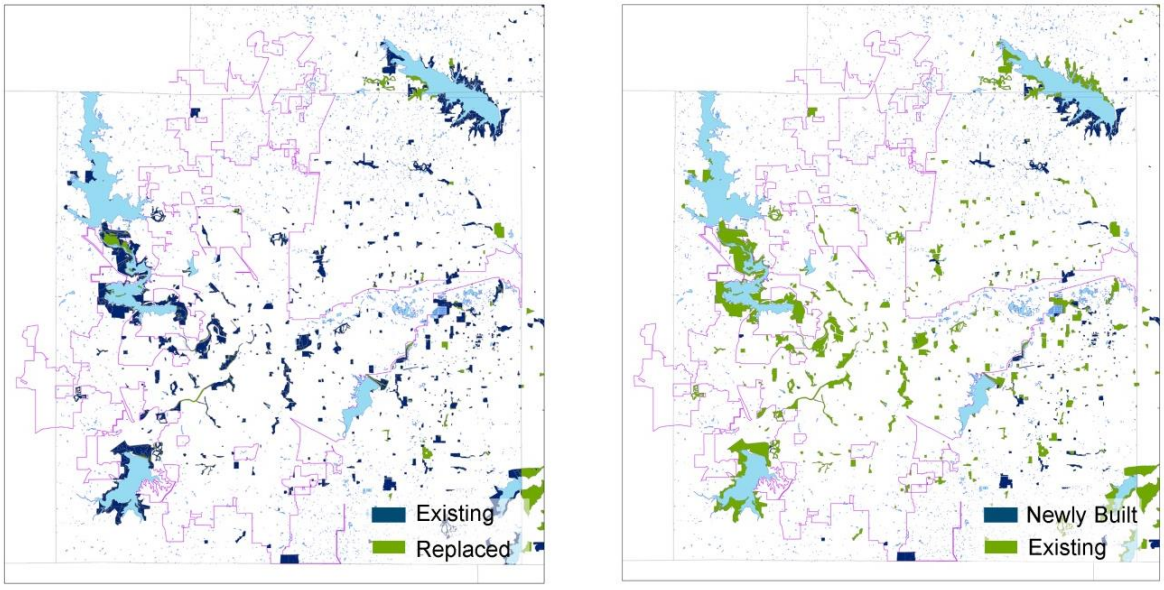
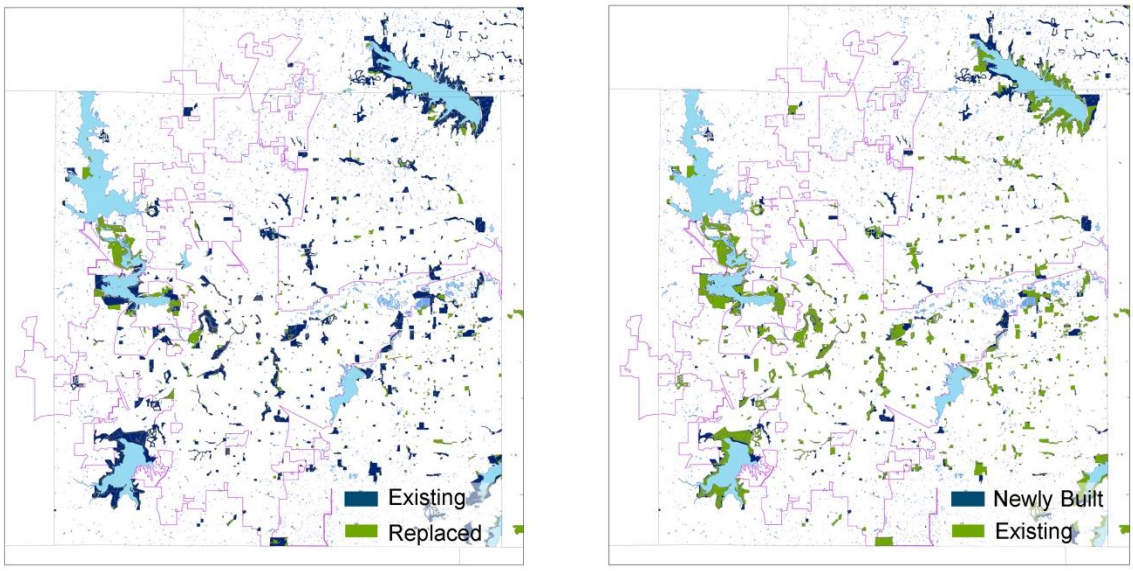


(b)

Figure 4.16 (a) Parks Plan in 1990 and 1995 (GIS Data 2005)
(b) Parks Plan in 1995 and 2000 (GIS Data 2005)



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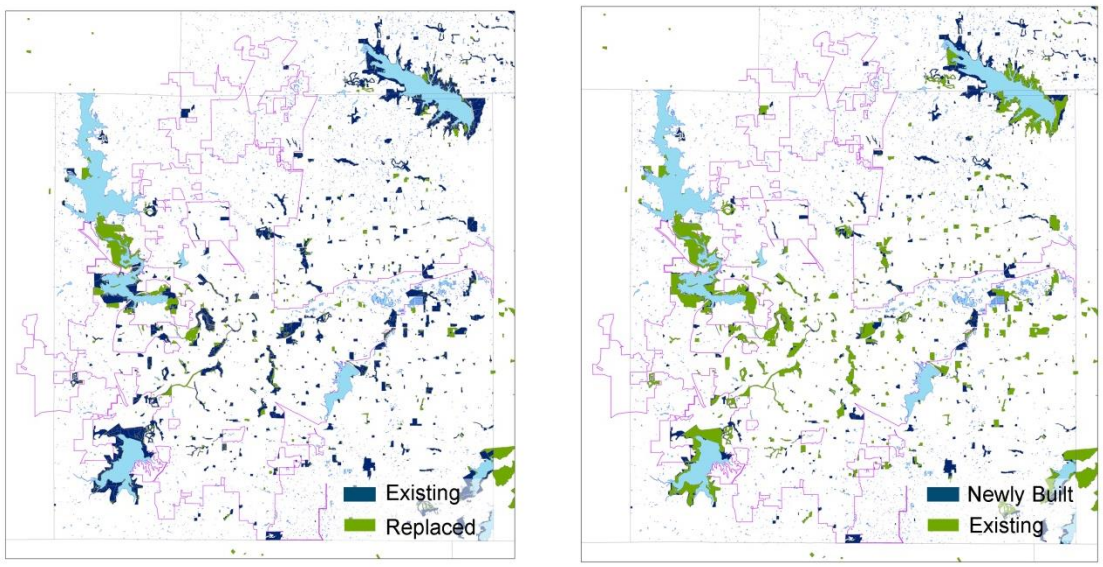


(b)

Figure 4.17 (a) Parks Plan in 2000 and 2005 (GIS Data 2005)
(b) Parks Plan in 1990 and 2005 (GIS Data 2005)

4.4 Analysis of Interviews

Interviews play a significant role in understanding the process and the principles of the city's development. This thesis concentrates on the relationship between urban morphology and the parks system which requires a deeper knowledge about the combination of land use, planning, open space, and historical background. Most of the interviewees understand the complicated mix but some show very little concern about the relationship between each of the elements.

It was presumed that the selected interviewees know Fort Worth very well and had a solid understanding of Fort Worth's city planning, including the parks systems and the urban morphology. They provided large amount of information based on their best professional understanding of this thesis. Incorporating different backgrounds helped to limit the amount of human bias.

Table 4.1 Interviewees' Background

Respondent	**occupation**	**Years involved**	**Working Area**
1	Researcher	3	History
2	Planner/landscape architect	(not indicated)	Planning/Landscape Architecture
3	Landscape Architect	(not indicated)	Landscape Architecture
4	Researcher	3	Downtown vision/ History
5	Landscape Architect	12	Landscape Architecture
6	Historian	lifetime	History
7	Planner/landscape architect	35	Planning/Landscape Architecture
8	Planner/Landscape architect	25	Planning/Landscape Architecture

4.4.1 Fort Worth's Development Based on the Parks System

Respondent 7 indicated the open space component significantly influenced the quality of natural features. The parks system in Fort Worth both intentionally and unintentionally influenced the city's land use. When the system for parks was applied, it worked like a magnet,

enticing people to spend time in the parks or to search for housing options adjacent to the parks. With the influx of people, interest in the area grew, and business opportunities were created in the areas, similar to the expansion around Central Park in New York City.

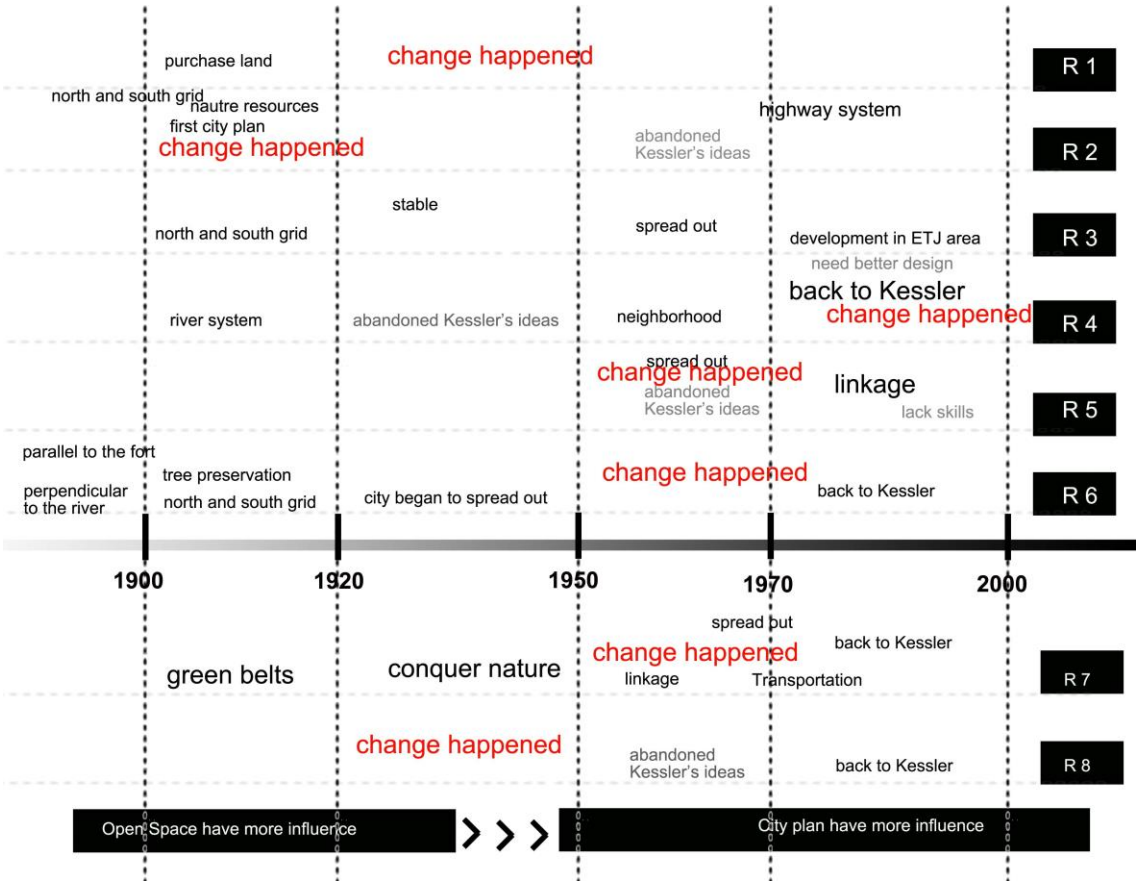


Figure 4.18 Key Words from Interviewees on the City Development

Above are the key words and phrases that respondents mentioned in the interviews. According to their opinions, the study is divided into five time ranges. During this different time ranges, interviewees mentioned there are significant developments or changes to the city and the parks system in the Fort Worth area.

4.4.1.1 Before the 20th Century

Fort Worth's first formal parks system was created in the first decade of the 20th century; the city existed for 60 years before having a formal parks plan. Parks were given to the city by private individuals. Respondent 6 indicated that Burnet Park, in the downtown area, was

a private gift even before the city had a Parks Department. The city was not able to develop to the west until the late 20th century because of the natural barriers of creeks and streams which dictated the open space for the city in the early years. Thus this demonstrated that the city's shape was more influenced by geography before the 20th century.

Respondent 6 also indicated that the core area of the city was perpendicular to the river based on the orientation of the original fort. Subsequent parks were built within the grid system which aligned parallel to the fort. It was not until the 1870s that the city became orientated to the north and south.

Figure 4.19 Perspective map of Fort Worth (http://texashistory.unt.edu/ark:/67531/metapth190719/ 2013)

4.4.1.2 Beginning of the 20th Century

Respondent 2 indicated that at the beginning of the 20th century, Fort Worth began to realize the importance of land use planning and its influence. Three respondents mentioned that industry sprang up right next to residential areas with very little open space. Respondent 2

pointed out the first designed open space in Fort Worth was the city park in 1892. The city was founded because of the rivers and the location of the forest along the Trinity River. The valuable open space systems and resources adjacent to the river ran through the entire city. Kessler's plan took advantage of green space along the water and built linkage with all the parks. The natural features not only shaped the forms of the city, it also connected to the city's history. Respondent 7 indicated that the Trinity River was like the Potomac River in Washington D.C. The Potomac River not only shaped the city, but also American history because it was a major barrier during the Civil War.

Keesler's parks plan was a stage for setting up the relationships between the parks system and the city development. Respondent 2 indicated that, "The natural river system and flood plain have been determined as an effector in the city's shape or the form". Thus the city did not expand for years because it could not cross the barrier of the Trinity River. Both respondent 2 and respondent 6 mentioned, after Main Street was built, it became necessary to build connections across the river. Bridges opened the whole area and the area became industrialized, then the whole character of the city changed. The open space came as a response to the river. Old structures and processes shifted and changed the grids of the city. Respondent 6 indicated that at the beginning of the century, the industry corridors, train tracks, and sewage near the river made it a horrible place to be, but in Kessler's vision, the river should provide better open space and help to inform today's land use planning. The grids spread across the river by merging Kessler's original axis and getting across the river.

Respondent 2 also indicated that, "For the city of Fort Worth, the first plan was the parks plan and the city plan came much later in the 1920s". Kessler's plan indicated the location of the floodplain, creeks, and waterways, the specifics of the urban form, and responded to these elements. The ideas conveyed by the plan presented the basic framework for future planning. Open space plans identified valuable resources and historic areas, these places were identified and preserved even before development occurs throughout the city.

Because the lands were privately owned, the city did not always have the funds to buy or protect them. Thus those lands should have been prioritized for acquisition and then utilized for the larger active parks such as athletic fields, and neighborhood parks.

4.4.1.3 From the 1920s to the 1950s

Respondent 6 indicated that between the 1900s and the 1920s, even into the 1930s, people could only move through the city by streetcars, walking or by horses, which followed the north and south grid. But later, it developed in all four directions. He also indicated that the grids changed because, at first, the city was separate by creeks and streams therefore it was hard for people to overcome the natural barriers. Thus, this change of grids really happened when people tried to conquer the natural boundaries, and when automobiles became more prevalent.

Both respondent 1 and respondent 4 noted that Kessler as well as Hare and Hare advised Fort Worth to purchase certain parcels outside the city for park land uses before it developed even further. The city took their advice, even though they did not know what they were going to do with it, except to set it aside for the future development. In most cities, as the urban core expanded, parks followed however, Fort Worth's parks led the city's development; they were established before the actual city plan was. For instance, the city's development and movements were all toward the already-established Lake Worth before the middle of 20th century.

Respondent 4 argued that open space planning had little impact on the shape of the city when compared with water and rail. Parks were built along the river on the floodplain and then the railroad came, which separated the city into pieces. Thus, there was little connectivity between those pieces. Highways and railways divided the shape of Fort Worth into pieces rather than retaining the whole.

4.4.1.4 From the 1950s to the 1970s

Respondent 4 indicated that in the 1950s and 1960s, Fort Worth abandoned Kessler's ideas. Instead, most of the urban development and planning focused on placing new parks in the downtown area rather than improving the existing parks. Respond 6 indicated that, "The period between the 1940s, 1950s, and 1960s, the city began to spread out, which made the city pretty chaotic". Through the 1950s and 1960s, the city had a large number of neighborhoods, but there was very little public open space such as parks and playgrounds.

4.4.1.5 After the 1970s

Most of the respondents indicated that it was not until the 1970s that the city returned to the original Kessler idea. Almost 60 years later, Fort Worth started to redirect the focus back to the river. The city cleaned up the river, invested in trails, parks and the river system. As the city grew accustomed to the shift in focus, development moved further away from the core. Respondent 2 indicated the development increased dramatically with the introduction of the highway system which began in the 1950s.

After the 1980s, the growth of the city became more stable and swung back to the north and south grid again. Respondent 3 mentioned there were many reasons which led to those results. Development to the west and east stopped when it hit the boundary of other cities, while to the north and south; there were still large amounts of vegetated ETJ area available for development.

It is evident that, at first, the parks plan had more influence on Fort Worth's development and planning. With the rapid development of Fort Worth, the city plan began to influence the parks development more. Six of the interviewees were confident that there was a change in focus, but their opinions about when the change occurred varied. Their answers, which can be found in the table below (see Table 4.2), ranged from the 1930s to the 1950s and even up to the 1970s. Although there was a wide date range, there was one thing in common. During these periods, Fort Worth was involved in big events such as World War II, rapid

development and increased population as well as the Great Depression. Meanwhile the increased population occurred from immigrants moving into the area from the north.

4. 4. 2 Influence of Land Use Planning on Open Space

Table 4.2 The Influence of Open Space Plans to the City Shapes and Land Use Planning

Respondent	Does open space planning affect land use/city shape or form?	Does land use planning affect open space planning?	When did the change happen?
1	Yes	Yes	After World War II
2	Yes	Yes	1930s
3	No	Yes	None
4	A little	Yes	1970s
5	Yes	Yes	When the economy changed a lot
6	Yes	Yes	1950s and 1960s
7	Yes	Yes	1950s and 1960s
8	Yes	Yes	After World War II

From the table above (see Table 4.2), it can be conducted that two of the respondent are not confident about whether open space planning affects land use or the city's shape and form. One argument from respondent 3 is that the city's boundary is more like a political decision which does not necessarily relate to the natural resource and open space. Because the city boundary is an indistinct political line, it is hard to pinpoint where the expansion begins – especially since the ETJ, areas are already there when the city expands. Outside the ETJ, the city cannot acquire land from other cities. According to respondent 3 the development of the east part of Fort Worth is the result of acquiring land so that the city could have frontage adjacent to DFW airport.

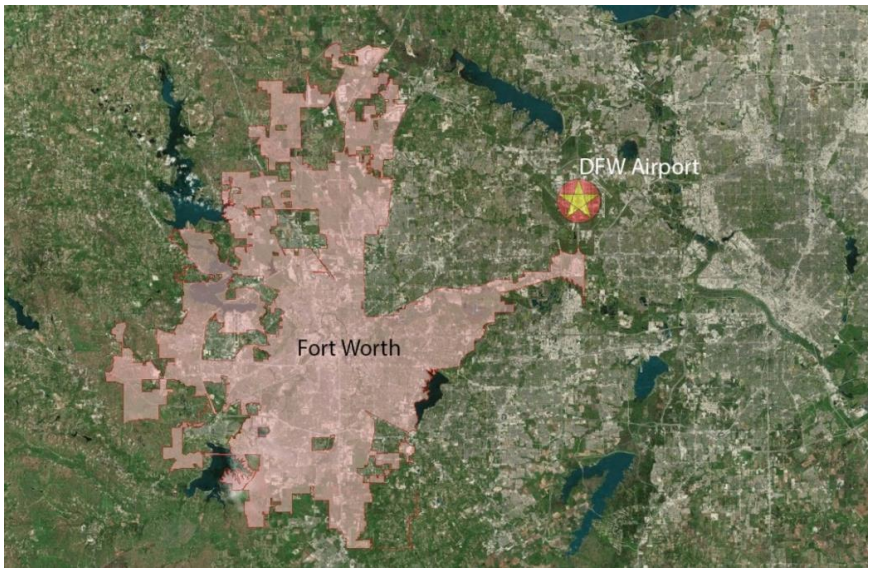


Figure 4.20 Airport Location (GIS Data 2005)

Respondent 5 indicated that, in some cases, parks systems were not as significance to the city's development compared to land use. Development was based more on the social-economic situation that affected the city. Respondent 2 mentioned, "When seen through the evolution of history, both the open space system and land use happen at the same time, sometimes transportation dominates, sometimes floods dominate".

All of the respondents mentioned that Fort Worth's land use plan significantly influenced the parks. Only respondent 7 indicated that land use should respect open space planning and land use plan should not dominate open space planning. He said, "Land use planning should build around the open space, the open space plan should create a fabric around how the land is used." This opinion was very different from those expressed by the other respondents. He thought that open space should be traced and it should come before the land use planning. Thus the land use should not affect the open space planning. He also indicated that the city ignored the previous plans during from the 1950s, through the 1970s. Most of the respondents indicated the city was growing dramatically. People's living environment was not improved.

Industry was next to neighborhoods and open space. It was not until after the 1970s that the city began to realize the importance of open spaces again.

When considering the usage of land, it impacted the adjoining open spaces. For example, respondent 1 indicated that, “Parks have been affected by planned highways, sometimes parks get eaten up when a highway goes through. The interstate by the botanic gardens actually took away some of the land that was really part of the gardens.”

Respondent 2 indicated that the significance was the land use had many different portions, it integrated and influenced how people thought about open space usage. This was not what Kessler would have imaged. Respondent 2 also mentioned that, “Kessler’s vision was more like a big Chicago thing, he saw the industry fading away. He had a great vision for open space but not necessarily how the city would evolve around it.” The respondent also noticed Kessler was deeply influenced by Olmstead. Kessler tried to find a spot for the open space and parks, which brought landscape into the city to provide a better living environment.

4.4.3The Influence of Kessler’s Idea on Fort Worth

Table 4.3 Interviewee’ Opinion Toward Kessler’s Influence on Fort Worth

Respondent	Does the 1909 Kessler plan still affect Fort Worth?	What are examples of the influences?
1	Yes	• Fort Worth Botanic Garden • Forest Park • Sycamore Park • Glenwood Park
2	Yes	• Playgrounds • Parks • Neighborhoods • River System
3	Yes	• Trinity River • Forest Park • Sycamore Park
4	Yes	• Neighborhoods
5	Yes	• Green Corridors
6	Yes	• Lancaster Corridor • Main Street
7	Yes	• Circle Park • Botanic Garden • Forest Park
8	Yes	• Sycamore Creek

All interviewees shared the same opinions that Kessler's plan still influences Fort Worth. Respondent 2 mentioned the parks plan today was still tied to the river system. For instance, Sycamore Park, Forest Park, and Hillside Park were all built by the river or along the creeks.

Whether consciously or not the current parks system preserves Kessler's idea. Most of the parks, including the Botanic Garden and Trinity River Parks, are still in existence and are some of the biggest green spaces and popular attractions for both citizens and visitors. These spaces impact future parks plan and the image of the city.

Unfortunately, by this time, most of the rivers had been channelized for flood control which is not a natural resource, but is still a resource worth protecting as respondent 4 indicates. Respondent 7 pointed out after the big floods in 1908, 1922, and 1949, the city basically turned the river into a big drainage system. Even though the river was wide, there was not enough water flowing. The landscape was empty, and the river lost its natural scenery. For the Trinity River Vision project the city is working on a channel to bring down some of the levee, where there used to be heavy industry (Kline 2010).

Respondent 4 mentioned Kessler's idea of bringing neighborhood parks and making connection between them has been realized. Even though the city has a very limited budget, the vision can still be achieved. Fort Worth has a long history of neighborhoods with recreation and open space. There are health benefits to setting up neighborhood parks. One of the positive aspects has been the integration of neighborhood with neighborhood parks so that now, the parks are well maintained.

As respondent 6 noted Kessler's plan indicated the importance of open space. Fort Worth not only realized the importance of open space, it also paid attention to tree preservation. In reality, most of the trees were planted in the last hundred years. Kessler helped the city to focus on the importance of green space provided by trees. This respondent argues that without Kessler's plan, the city probably would have followed the same patterns as many western cities,

using that open space for industry activity which would have polluted the city even further. Kessler's vision was not only predictable but also sustainable.

After Kessler died in 1923, Fort Worth hired Hare and Hare as the park consultant. Hare and Hare basically continued with the same objectives that were in Kessler's plan. In the long gap between 1909 and 1930, no one was planning the parks system for the city; possibly due to World War II and the Great Depression as Respondent 7 indicated. During the gap, landfills were placed by the rivers, which was not one of Kessler's ideas.

All of the interviewees supported Kessler's plan, and they all agreed that it was a good start for the development of Fort Worth, but there were still some arguments about whether the city did done a good job in preserving Kessler's plan. Some entries to the parks system are inaccessible because of new construction and infrastructures. Compared with Kessler's idea, current projects lack a sense of space and openness.

Respond 5 indicated that based on Kessler and Hare and Hare's idea, the stretch of Lancaster Avenue that goes through the cultural district should give people a sense of scale and distance. Unfortunately, over the years, the city failed to preserve its past. The new construction and access from museum to museum lost the original scale and destroyed the view of the corridor. Lake Worth was once considered the largest urban park in the world with almost 9,000 acres between the water and land, but the city had to sell some of the land that used to be the park.

Respondent 4 indicated that the parks plan could be much better today if the city recommitted to Kessler's vision. This respondent said, "In terms of how great this open space could be, they are just basically flat. The city did not focus on the open space itself as valuable. Trinity River Park is usually full of people but basically, they are just kind of flat areas next to the riverside".

Open space follow the natural features of the city therefore, it needs dedicated work, even if it is on blank land. The land doesn't always have streams, water, or hills as natural

features, therefore the designers must use their imagination to create beautiful landscape views.

Besides the city core area, most of Kessler's ideas have been preserved. Respondent 8 indicated that the city has completed about 80% of Kessler's plan. But Kessler had no idea how much the city was going to develop. Respondent 7 indicated that the boulevard system was not instituted well. In terms of the vision for downtown, the green belt remains, but the idea of the boulevard system was not well-preserved.

The Trinity River had a significant influence on the open space in Fort Worth. It provided bio linkages and open spaces. Kessler and Hare and Hare stressed the importance of linkages, so the open spaces were a component of moving people through the city and being able to get away from the urban grid. Respondent 5 indicated that the strong linkage between downtown and the cultural district showed an example of the open space influence that shaped the city. The culture district, the Lancaster Avenue Corridor, and the linkage to Trinity Park, expanded to become a highly-valued linkage between the downtown corridor and the museum district.

Kessler's plan had a strong influence, especially before the 1950s, because:

- Most of the existing parks are in the flood plain which is not an ideal place for residential or commercial constructions
- The parks Kessler proposed havve unique scenic views, which represent the natural characteristics of Fort Worth
- Built parks have strong financial and political supporters
- The development of the city expanded outward, half of the focus and attention was on the new development rather than redevelopment of the older areas

Interviewees mentioned these open spaces that were preserved from Kessler's plan:

- Lancaster Corridor
- Main Street

- Circle Park
- Botanic Garden
- Forest Park
- Glenwood Park
- Sycamore Park
- Trinity River Park

By combining the analysis from the old plans and some of the findings from the interviews, the characteristics of today's parks in Fort Worth include:

- Development that provides more obvious linkage and connections
- Easy access to the green infrastructure for residents
- Development of parks based on the needs of the living environment

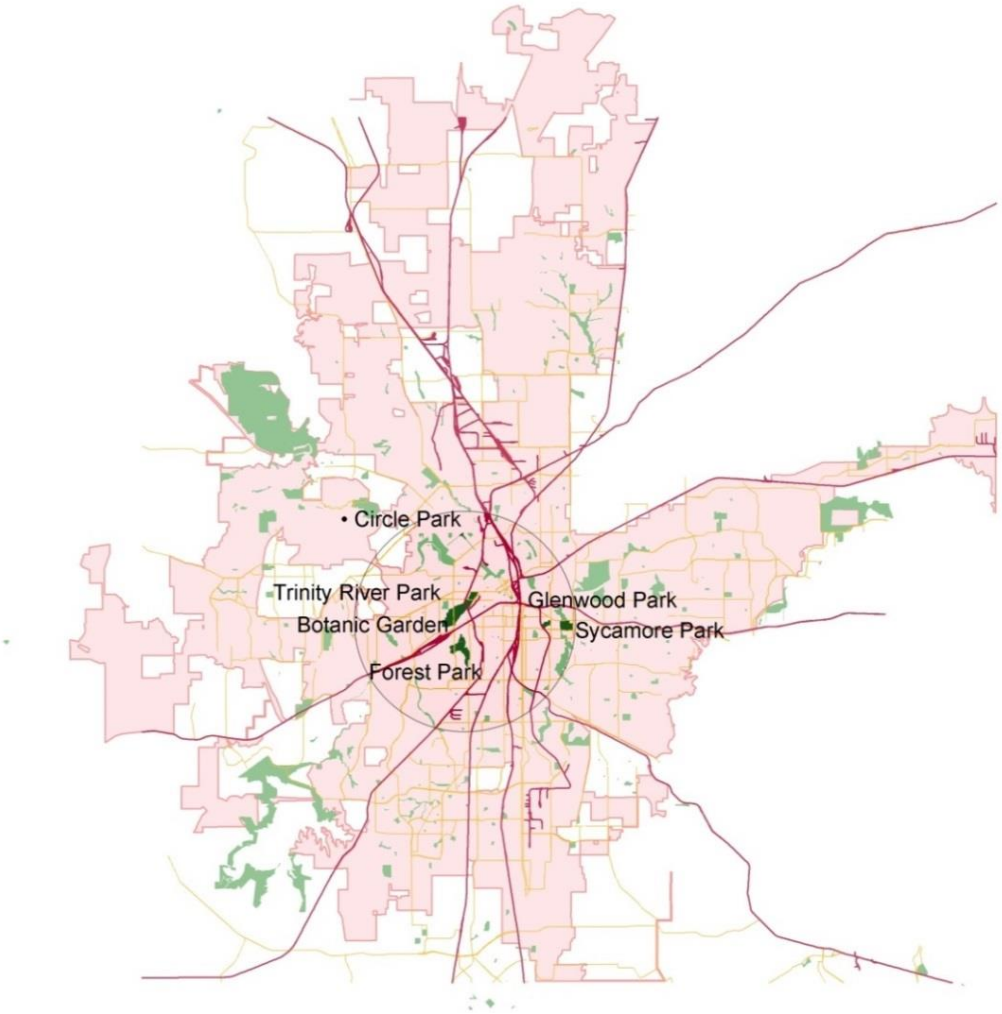
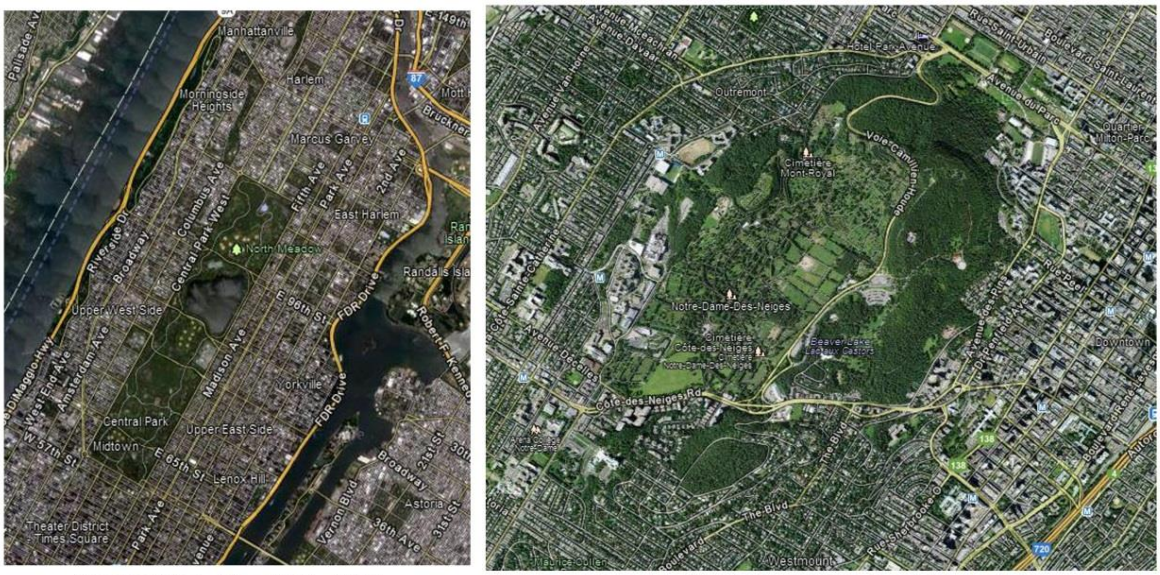


Figure 4.21 Parks preserved from Kessler's plan (GIS Data 2005)

4.4.4 Kessler's Inspiration

Four of the respondents mentioned that Kessler was strongly influenced by Olmstead. For example, the greenbelts followed Olmstead's concept of the Emerald Necklace in Boston. Respondent 2 noticed Kessler looked at parks from a very different perspective because of the way parks looked at that time, such as Central Park and Mount Royal Park in Montreal. Both of them were regarded as an escape from the city.



Central Park New York, USA

Mont Royal, Montreal, Canada

(a)

Central Park New York, USA

Mont Royal, Montreal, Canada

(b)

Figure 4.22 (a) Plan View (Google Map 2013) (b) Sketch

Fort Worth developed this relationship between the city shape and the open space from Olmsted through Kessler and then to Hare and Hare through the 1920s, 1930s, and 1940s,

which benefited several generations with similar planning principles for open space. This philosophy taught people to work and design with nature.

4.4.5 Summary

Some of the interviewees were restricted to their own professional areas. For instance, the opinions of landscape architects focused on the individual parks rather than the relationship between the land use or the city plan and parks system. Conversely, individuals from relatively different backgrounds, such as the researcher and the historian, presented their ideas regarding the process of how the parks developed and the reasons behind them. Most interviewees did not have the understanding of how the parks influenced planning or the land use plan in Fort Worth. Planners were more likely to provide ideas about the process and how the parks plan affected the city plan providing a whole picture of how the process worked.

Limitation of these findings from interviews:

- Lack of solid historic information
- Limited number of interviewees
- Human bias

4.4.5.1 Similarities Between the Interviewees

Even though these interviewees were from different backgrounds, all shared an important role. Everyone lived in or worked for Fort Worth for a relatively long time. Ideas and opinions were from a professional understanding, as well as the perspective of the ordinary citizen. The interviewees provided valuable opinions which would be difficult to obtain from books or other documents.

From the interviews, respondents expressed very different opinions about the time that the influence shifted between the land use and parks system. But one thing became clear, the change happened in association with a big event.

4.4.5.2 Differences Between the Interviewees

The eight interviewees were from different academic and professional backgrounds. Responses related to the interviewees' experiences and understanding as well as any bias. Discussing the same project, different people had extremely different opinions. For example, the attitudes toward the development of the Trinity River varied. One interviewee indicated that it was a wonderful project that provides links from the city to adjacent environments and preserves the natural resources in Fort Worth. Other interviewees suggested that the Trinity River can be much better and that the plan for linkage with the adjacent environment was not as effective as it should be. Different opinions helped to understand this project from different perspectives and helped this study to assess different opinions while providing suggestions for future planning.

4.4.5.3 Suggestions

During the interviews, some suggestions for future planning or improvements were also mentioned by the interviewees:

- The city's planning and zoning departments should work together to propose a comprehensive plan
- Open space planning should be considered before land use
- The city should provide easily walkable access for the open space while considering the linkage
- The landscape architects should provide well-designed scheme for open spaces

4.5 Conclusions

Based on the old plans, historic photos, written documents, and interviews, the analysis provided the expected findings. The parks system played a significant role in Fort Worth's development. At first, the parks plan had a significant influence on the city's shape, and helped planners and designers to understand the natural features of Fort Worth. As the city developed

rapidly from the 1930s to the end of World War II, the city plan or land use plan began to have more influence on the parks plan.

Without a doubt, Kessler's plan continues to affect the city, and not only in a physical way. Kessler's philosophy for the open space planning, such as linking the city with parks, providing a healthy place to live, and offering a gateway for the citizens, can still be seen in n the core area of Fort Worth today.

Since this thesis is a first approximation for the research results, it expects that with further development, more detailed analysis is going to take place and provide a solid basis for future planning. This chapter discusses the evolution of urban morphology and the parks system of Fort Worth. The relationship between the urban morphology and the parks system is complementary. The parks system influences the urban morphology to some extent in the early years after Kessler's plan, but with the dramatic development of the city, it changed. The city land use and development has more influence on open space system. Findings in this chapter show examples of how Fort Worth adopted a parks plan and implemented it for an extended period of time and how it dealt with the development problems in implementing the plan. Fort Worth's example is unique but also common. The following chapter is going to discuss the significance and future research based on the analysis in this chapter.

CHAPTER 5

CONCLUSIONS

5.1 Important Findings

This thesis indicates open space planning has a significant influence on the urban morphology of Fort Worth by incorporating and preserving natural features and resources. Fort Worth has been strongly influenced by its first park plan proposed by Kessler in 1909. This plan helps planners to locate the natural resources and provides an eco-linkage system for the city.

This thesis indicates GIS is an important tool for separating urban landscapes into portions. The GIS program makes it easy to highlight the different land uses and separates urban elements, such as water body, commercial, transportation, and so on. After analyzing the elements separately, it is also easy to overlay them and study their relationship. This provides important technology to do the plan analysis through the different maps.

Based on the findings from the interviews and the analysis of the old maps, most of the original natural elements of Kessler's plan have been preserved as illustrated by the fact that successive plans have followed Kessler's basic concepts. Even though interviewees come from different backgrounds, they all share the same opinion that Kessler's plan still influences the city in a positive way; both in the physical shape and principles of parks system. Kessler's plan can still be traced in the city core area and is being well preserved. This thesis demonstrates the success of the Kessler plan and how it fits into the development of Fort Worth.

In the mid-20th century, after Fort Worth discontinued the contact with Hare and Hare, the influence of Kessler's plan on urban morphology lessened compared with the previous years. The weakening influence was not only because the city changed the planner or designer, but also because the city expanded dramatically during that time.

Many other significant elements influence the city's development. Based on the image of the city's growth, it can be concluded that after the 1980s, the form and the shape of Fort Worth became more stable. The city began to grow toward the north and south grid again rather than the four directions. As the city developed dramatically moving beyond the natural barriers, the city's characteristics changed over time. The land use played a more important role in forming parks system, but it also followed Kessler's principle idea.

Another important finding is Kessler was deeply influenced by the idea of Olmsted, both of them consider parks as a green escapes for the citizens. Thus Kessler may not conscious that his plan may influence the urban morphology of Fort Worth. Their design principle shows their respect for nature, which continues to be a sustainable way to do design. Good plans require designers or planners to work together and think as a whole to consider the parks development and how it can serve people better.

5.2 Relevance to Landscape Architecture

By presenting the evolution of the parks system in Fort Worth and its relationship with urban morphology, it helps the designers and planners to "read" the city better. Nowadays the culture and natural resources have become very important elements for the city to develop. Fort Worth has many important resources which can be used to develop the city further and enhance the character of the city.

This research studies how a long-term planning can influence a city's future shapes and form through preservation of natural resources and other open space. Thus, landscape architects and planners can use processes from this research to visualize a city's future morphology as part of long-term planning.

Understanding and working with urban morphology strengthens a designer's skills in planning and designing open space, particularly large parks and parks containing a natural resource base such as woodlands, riparian systems, terrain, and so on.

5.3 Suggestions for Future Research

This thesis revealed several opportunities for the future study:

1. Create a GIS software model that specifically integrates archaeological, historical, and cartographic evidence for mapping and analyzing urban landscapes, and that can release spatial historical data via Internet for public access.
2. Execute further analyses in cities where Kessler plans were adopted such as Dallas, Houston, and Kansas City.
3. Develop a research project that assesses uniqueness and significance for applying urban morphology-open space theory to other American cities.

5.4 Summary

The goal of this research is to present the relationship between the urban morphology and the parks system in Fort Worth. Through studying the evolution of the parks system and how the city implemented Kessler's plan over time, it is going to help planners and designers to "read" the city better and provide a basis for the future planning. In this research, it is concluded that Fort Worth developed from a fort along the Trinity River, when helped shape the city from its beginning. The first growth of the city, which today is known as the downtown area of Fort Worth, was built perpendicular to the river and lines up with the courthouse. As the city began to spread, the orientation began to line up exactly to the north and south grid. With the help of Kessler in the early 1900s, the city developed its first plan: a city park plan. This park plan helped the city to shape its natural and cultural character. It uses the parks system as a linkage to connect the city together and provides gateway for citizen to get away from the urban life to enjoy the natural scenery. With the implementation of this plan, the city begins to link by these parks system. It is hard to determine whether it is the parks system affects the urban morphology or the urban morphology influence the parks system.

From the process of the development of the urban morphology it helps to understand the reasons and the influence of the city development. All of these changes are influenced by the particular time periods and special events at that time. Kessler's park plan for Fort Worth, which has survived for century, not only contributed to the preservation of the natural and cultural character but also influenced the urban morphology in a relatively positive way. Kessler's plan helped Fort Worth to indicate the city characters and has proven successful over time. It is important to follow his suggestions to link the city by open spaces system and provide a healthy environment for the citizens. This is also the mission for the Parks and Community Services Department, "to enrich the citizens' lives through the stewardship of resources and the responsive provision of quality recreational opportunities and community services" (Parks and Community Services Department 2012).

APPENDIX A

IRB APPROVAL LETTER

Office of Research Administration
Regulatory Services
817-272-3723
regulatoryservices@uta.edu
http://www.uta.edu/research/administration

Institutional Review Board
Notification of Exemption

February 19, 2013

Dandan Zhu
Dr. Pat Taylor
School of Architecture
Box 19108

Protocol Number: 2013-0447

Protocol Title: *Urban Morphology, Open Space Planning and Analysis Tools: Fort Worth Since the 1909 Kessler Plan*

Type of Review: **Exemption Determination**

The UT Arlington Institutional Review Board (IRB) Chair, or designee, has reviewed the above referenced study and found that it qualified for exemption under the federal guidelines for the protection of human subjects as referenced at Title 45 Part 46.101(b)(2). Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:(i) information obtained is recorded in such a manner that human subjects can be identified, either directly or through identifiers linked to the subject; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation. You are therefore authorized to begin the research as of **February 19, 2013**.

Pursuant to Title 45 CFR 46.103(b)(4)(iii), investigators are required to, "promptly report to the IRB ***any*** proposed changes in the research activity, and to ensure that such changes in approved research, during the period for which IRB approval has already been given, are **not initiated without prior IRB review and approval** except when necessary to eliminate apparent immediate hazards to the subject." Please be advised that as the principal investigator, you are required to report local adverse (unanticipated) events to the Office of Research Administration; Regulatory Services within 24 hours of the occurrence or upon acknowledgement of the occurrence. All investigators and key personnel identified in the protocol must have documented Human Subject Protection (HSP) Training on file with this office. Completion certificates are valid for 2 years from completion date.

The UT Arlington Office of Research Administration; Regulatory Services appreciates your continuing commitment to the protection of human subjects in research. Should you have questions, or need to report completion of study procedures, please contact Robin Dickey at 817-272-9329 or robind@uta.edu. You may also contact Regulatory Services at 817-272-3723 or regulatoryservices@uta.edu.

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She is interested in the urban design and historic preservation. She hopes to create environment that can hold people's memory and meet their needs.